Smithsonian Institution

Smithsonian Facilities

Photo by Mike Halworth

FINAL DESIGN SUBMISSION

National Capital Planning Commission
06 April 2017

Smithsonian's National Zoological Park
Renew Bird House Facility -
Experience Migration on Bird Plateau

SF Project No. 0933101
QEA Project No. 31307600

QUINN EVANS
ARCHITECTS

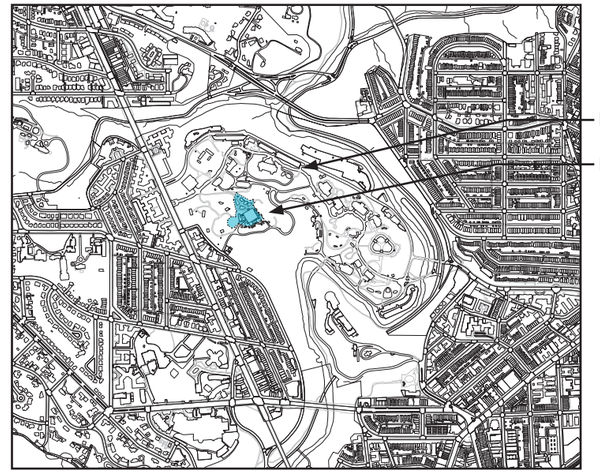
THE
PORTICO
GROUP

PROJECT NAME

Renew Bird House Facility - Experience Migration on Bird Plateau

LOCATION

Smithsonian Institution
National Zoological Park
Washington, DC



AGENCY AND CONTACT

Smithsonian Institution
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Final Submission Requirements:

- **Letter requesting NCPC review** - provided under separate cover
- **Project Booklet**
  - Photographs of the existing site - *included within project booklet*
  - Vicinity map of the project area - *included within project booklet*
  - Site plans showing existing conditions and proposed work - *included within project booklet*
  - Landscape plan with topographic contour line and plant material list - *included within project booklet*
  - Complete floor plans, elevations, and roof plan showing the existing conditions - *included within project booklet*
  - Complete floor plans, elevations, and roof plan showing proposed work - *included within Construction Documents (A-100 and A-200 series)*
  - Construction details - *included within Construction Documents (A-300 series for architectural).*
  - Rendered perspectives and/or three-dimensional massing model drawings, as appropriate - *included within project booklet*
- **Digital presentation file**
- **Photographs of physical model** - *included within project booklet*
- **Samples of all exterior materials and finishes** - *included within project booklet*
- **Construction Document Set**
  - Relevant sheets for;
    - Stormwater management
    - Tree preservation plan
    - Architectural plan, section, elevation, and wall section

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experiencemigration
on bird plateau

Inspire visitors to find a connection to the wonder of migratory birds.

- Convey the four interpretive messages:
  - The annual cycles of migratory birds are complex.
  - The bird migration journey is perilous, spectacular and awe-inspiring.
  - Understanding that the same bird lives in multiple places connects me to people in other parts of the world.
  - Now is the time to study and protect these birds and their habitats.
- Create activated spaces that make Smithsonian Migratory Bird Center's scientific research accessible to visitors and science professionals, throughout the site, specifically in the tracking station and demonstration space.

Build opportunities for special experiences and events that promote education, social interaction, and revenue generation.

- Build a multipurpose private classroom to serve 20-40 people, with direct outdoor access.
- Build space and infrastructure to support off-hours events for up to 150 people.
- Design and build infrastructure to support the seasonal operation of a café and merchandise cart.
- Build a secure educational space for 25 people for educational talks, including "meet a bird."
- Create space and infrastructure to support the Migratory Bird Center and 20 visitors with direct outdoor access.
- Create a dynamic play space.

Provide an immersive, multisensory visitor-friendly experience that orchestrates Wow! moments and opportunities for interaction and reflection.

- Allow the visitor to experience immersive animal habitat exhibits that reflect the flora and characteristics of the animals' natural environments.
- Designate gathering areas of varying size and character to support engagement with the birds in their habitats, as well as social interactions with keepers, volunteers and other visitors.
- Design clear and fluid pathways, accessible facilities (toilets and water), refreshments, and areas for rest and reflection.
- Engage visitors with a multisensory theatrical experience that highlights aspects of migratory birds not otherwise showcased in live exhibits.

Provide the best avian animal care to support bird well-being, enrichment, diet, husbandry, and health maintenance of a diverse collection of species.

- Build varied and enriching habitats that support the health of the animals while meeting keeping and holding requirements.
- Build ample, flexible support spaces, including food prep, holding, incubation, hand rearing and sick bird care, to effectively and efficiently care for the collection animals and enable ongoing conservation and research efforts.
- Build habitats that are safe for staff to access for maintenance and daily and emergency animal care.

Provide an efficient, durable and low-maintenance facility that demonstrates and validates sustainable principles.

- Design and build a robust building and systems with adequate facility support space that will operate efficiently while supporting projected visitation throughout the seasons.
- Incorporate and integrate exhibit and constructed wetlands to create an immersive entry landscape and water based habitat.
- Conserve energy and water, and integrate sustainable design features to achieve a LEED Gold rating or higher.
- Provide required emergency power to support animal environments and animal care during crisis situations.

PART 1: PROJECT REPORT

1.1 PROJECT DATA

Project Area & Building Area
The project comprises the renovation and restoration of the existing 26,700 gsf Bird House Building, the design of a 2,500 gsf addition(s), the redevelopment of 34,000 gsf grounds for the northern site arrival area and the minor renovations to the 12,800 gsf Great Flight Aviary.

The total proposed area for the renewed Bird House is 29,200 gsf. The site area impacted by this project is currently part of the Bird House experience and the site boundaries remain the same as existing.

Assigned Employment
Up to 13 full time employees are assigned to the existing Bird House and associated animal yards. No change of assigned employees is envisioned as a result of this project.

Project Cost, Funding and Schedule
The project has an estimated construction cost of more than $25M. It will be funded over fiscal years FY17, FY18, FY19 and FY20 with federal and non-federal private funds. The project is scheduled to be constructed beginning in October 2017 with an estimated two year period of construction. Public will not have access to Bird Plateau while under construction.

1.2 PROJECT NARRATIVE

The proposed design for the Bird House Plateau and *Experience Migration* on Bird Plateau exhibit addresses the need for upgrades to a facility with dated and unfocused exhibits, out-of-date systems, and significant deferred maintenance. The proposed upgrades include:

- A revitalized and welcoming arrival experience where visitors can reorient, gather and view wild birds engaging in habitat designed to entice and entertain.
- Immersive exhibit spaces vividly representing the habitats that migratory shorebirds or songbirds inhabit.
- Updated exhibits that tell the story of the annual life cycle story of a migratory bird.
- A variety of hands on learning spaces giving the visitor an opportunity to learn about birds in both formal and informal spaces.
- An updated animal collection dedicated to supporting the interpretive story line and Smithsonian conservation stories
- Improved animal holding areas to support animal care and management.
- New site and building systems to support state of the art exhibits, effective management, sustainability practices, and current codes.

Development History
The Bird House, designed by municipal Architect Albert Harris, was originally completed in 1928. The architectural form of the building was a square, single story brick masonry structure with a flat roof, punctuated by skylights. At the building's center was a great flight room. This flight room had a red tile hipped roof with a large skylight at its peak. This was much taller than the surrounding exhibit spaces which allowed a series of clerestory windows to bring natural light into the tall central space. The building's brick masonry exterior was highlighted by a gabled entrance. On each side of the entrance was a one-story vestibule with shed roof sloping away from the main building.

Beginning in 1935, an addition was constructed on the south side of the building. This addition, completed by the Public Works Administration, was substantially completed by November 1936. The addition extended the full width of the building and extended to the south by 43 feet. The addition's brick masonry exterior continued with the same style and ornamentation as the original construction, completing the composition.

By 1956, the building was over 25 years old, and a candidate for significant improvements. Building renovations completed between 1962 - 1964 included removal of the original gabled building entrance and the red tiled hipped roof. Flat skylights were installed over the central space. The Bird House reopened to the public in February 1965 as the first structure to be renovated under the Zoo's new master plan.

Perhaps the most significant undertaking of the 1960s-era renovations was the construction of the Great Flight Aviary. The form of the Great Flight Aviary consisted of six parabolic steel arches that formed a circle approximately 130 feet in diameter with a central mast height of nearly 90 feet. The aviary was covered by a vinyl-coated steel wire mesh with a grid measuring 1" x 2". The Great Flight Aviary was reached by a reinforced concrete bridge from the upper level of the indoor flight room.

Following the completion of the renovations in the mid-1960s, the Bird House received maintenance and repairs for the next 30 years. The building's mechanical system was replaced in the 1990s and an aluminum and glass addition was added to the building's east elevation in the mid-2000s. Aside from these relatively minor changes, the facility has remained largely unchanged from its 1965 appearance.

NZP Master Plan
The renewal of Bird House Plateau is a key element in the 2008 National Zoological Park Comprehensive Facilities Master Plan and the proposed approach is in alignment with the Master Plan goals. The renovation incorporates additional exhibits and animal holding areas; new educational spaces supporting the research mission of the Smithsonian, and new public restrooms.

Existing Context
The Bird House plateau is located on a relatively isolated area in the northwest corner of the park. Although the site is among the highest elevated areas of the zoo and has the potential for visual connections with areas to the north and east, dense foliage at the perimeter of the plateau provides a secluded character to the environment for much of the year. This quiet woodland environment, nestled against a steep slope to the west is unique within the zoo today. The plateau is currently connected to the other public zoo areas solely by the means of the Birdhouse Bridge, which extends from the plateau to Asia Trail at northeast. In addition to this public access point, the plateau is accessed by service vehicles off of Hawthorne Street NW, at the southwest.

The plateau features a number of distinct structures and yards that exhibit a variety of scales and architectural styles, according to their respective periods of construction. The bridge that brings visitors to the plateau (constructed in the 1990s) expresses a matter-of fact structural truss form in corten steel. At the center of the site, the dominant, brick masonry Bird House was constructed in 1927 and 1935. Significant modifications in 1965 included removal of the building's entry portico and hipped roof over the elevated central gallery in favor of understated modern replacements, a change that has since been regretted. The resulting entry sequence is indistinct, with views of the Bird House through the foliage limited to brief glimpses of a solid masonry wall. Concrete trellis structures lining visitor paths along the south and east sides of the site are formed of heavily-textured concrete. West of the Bird House, the Great Flight Aviary provides an energetic expression of tensile steel structure and powerful curved forms from the 1960s. The concrete bridge between the original masonry structure and the Great Flight Aviary spans the grades between with a massive arc supported by pyramidal piers.

Site Design
The proposed site design is rooted in an understanding of the historic site plan and an evaluation of its evolution over the last ninety years. The proposed site plan opens up the entrance to the plateau, which has become cluttered and overgrown, by providing a welcoming, gracious and refined entry space that includes a wide entry path, large clearing, and clear view of the visitor's destination. The entry path invites visitors to promenade around the edge of the site to view bird-friendly and pollinator-friendly habitats and integrated stormwater retention areas. Visitors can find a place to sit and enjoy lunch, pause and take in the beauty of the surrounding Rock Creek forest habitat. Specimen trees have been identified to be preserved and are integrated into the clearing providing bird habitat as well as shade for the visitors.

The planting plan is inspired by the movements of a murmuration. Bands of plantings mimic the movement, flow, and direction of birds in flight. Like a flock of birds that can be understood as one single moving element or as the movement of many individual birds, the plants will be seen and appreciated as a whole and at the individual plant level. Varying colors, textures, and scales of plantings will provide year round visual interest to the visitor as well as habitat for birds. Ornamental grasses, sedges, woody herbaceous shrubs, and ferns will provide a variety of scale and texture for the planting areas.

A primary function of the Landing, Promenade and Entry Plaza is to provide space for Zoo and FONZ-sponsored special events. This includes a requirement for open paving to install a variety of temporary tent sizes and functions. Additional trees have not been placed within the Promenade paving because of this essential program requirement.
The serpentine path is an important component of the Habitat trail that connects the Clearing to the Entry Plaza, Tracking Station deck and the westerly plant pollinator garden. The material of the serpentine path and habitat trail is crushed stone surfacing. The area in front of benches is designed as precast pavers to withstand higher wear and tear that would occur from moving feet of visitors sitting on the bench that would otherwise create a divot if designed as crushed stone surfacing.

Building Design
The Bird House Building will be revitalized in conjunction with the introduction of new Experience Migration exhibits and Smithsonian Migratory Bird Center educational activities. These improvements will be incorporated into the Bird House with the addition of a new, distinct but complementary addition to the building's north façade. While housing badly-needed educational and visitor services program areas, the north addition will address critical visitor experience and interpretive goals. These goals include the following: providing a focal point for the visitor arrival experience that acknowledges the multi-generational identity of the place; creating an animated, visitor-friendly north-facing façade; seamlessly extending the visitor path from exterior to interior exhibits; and referencing the lightness, power, and character of the bird collections. Visitor paths through the facility will provide immersive, multi-sensory experiences, comprised of paced arrival, social, and individualized moments. These early 21st century interventions will be complementary but distinct from the historic fabric, contributing a new chapter to the narrative of exceptional animal care, visitor experience, and interpretative facility for birds. Expressing the ethos and priorities of today these interventions will be rigorously detailed to support the next fifty years of service.

Bird House North Addition
The addition to the north face of the Birdhouse will support a welcoming entry experience that was lost with the 1960s renovations. The new building entry will reintroduce a central focal point for its facade using a new architectural vocabulary of distinct but complementary forms and materials. In scale, symmetry, use of material patterns, and central emphasis, the addition will relate to the historic Bird House. At the same time, the addition's materials, form, and light-filled approach to transitional spaces will be distinct from the original fabric, for a lighter, more inviting, and open bird exhibition building. At the interior, the reclaimed historic mosaic portal is situated at the terminus of the arrival experience. Visible through bird-friendly glazing, it provides a focal point for visitors from the moment of arrival at the plateau. Its reflective, metal shingle cladding will be sympathetic in color to the historic brickwork, while being contemporary.

The visitor is keenly aware of a sense of movement throughout the approach, by a changing understanding of the building form, and the play of natural light through, and reflected by the façade. Entering the light-filled arrival hall, the curve of each ceiling edge and fascia below the skylight opening moves the visitor though or around the historic portal to take in the first, breathtaking tropical aviary. The single gesture explicitly continues the curved vocabulary of the building exterior and interior, and hides the skylight edges from view. Additionally, detailing surrounding the portal surround has been refined to distinguish the ceiling geometry from the portal surround. These entry transitions foretell thresholds to be found through a variety of migration-themed, light-filled aviaries and intermediary migration exhibit passageways.

The surround material of the historic portal fabric is comprised of face brick with sympathetic (but identifiably new) hue, coursing, and detailing to the historic masonry. The transition between the surround and portal is addressed by an arched soldier course. New group spaces at either side of the entry will support conservation educational activities. The Migratory Bird Center's tracking station, and discovery classroom will each open out to outdoor teaching space. There, indoor-outdoor activities will be held throughout the year. Roof extensions provide shelter at the threshold between interior and exterior. Both facilities will be screened from the plaza by vegetation, with glimpses providing a sense of activity and movement beyond the building façade. The cantilevered ends of the roof extend beyond the walls, allowing the roof to hover over the interior/exterior threshold. Additionally, the construction and lighting integration details of the curved walls illustrate how the variation in panel colors and sizes, reminiscent of a sand hill crane's plumage, further reinforcing the lightness, power, and character of the bird collections.

Bird House Renovations
New features and treatments for historic features will be devised according to bird-friendly design principles that control the perceived scale of openings and distracting lighting effects that may be confusing and harmful to birds in the area. The exterior of the existing Bird House building masonry will be refurbishment, and existing tall gallery window openings reglazed. The leaky, flat polycarbonate central skylight of the 1960s will be replaced by a pyramidal formed skylight designed in conjunction with the new entry. The new enclosure will be comprised of a steel structure with an expansive ETFE skin for maximum glare-free interior natural light.

A new brick chimney enclosure will replace the existing chimney enclosure at the back-of-house areas south of the facility. Modifications will result in a total footprint roughly twice that of the existing chimney at the same height in elevation. The propose design has no visual impact on the primary public entrance at the north of the facility; no impact on the historic decorative panel west of the existing chimney; and the utilizes a modern brick of sympathetic hue, coursing, and detailing with respect to the historic masonry.

Great Flight Aviary and Bridge
The Great Flight Aviary is the site's iconic 1960s era architectural element. This project proposes a limited refresh of this incredible space which focuses on structural refurbishment and animal safety issues. These include refurbishment and enclosure improvements at the entrance structure, review and repair of the superstructure, and modification to the lower pool habitat to improve visibility of the animals, safety, and animal husbandry.

Visitor Experience
The architecture supporting Experience Migration will enhance the ways visitors experience the exhibit messages while relating to the larger NZP context and addressing long-term sustainability, and longevity. The facility will support highly social, interactive, and multi-sensory outdoor and indoor visitor experiences through immersive exterior and interior habitat design around and within the historic exhibition building. Ample circulation through the habitats connects viewing areas of varied character and messaging. Incorporation of a wide-spectrum of natural light for the health of interior collections contributes to the immersive effect.

2.0 TRANSPORTATION MANAGEMENT PROGRAM

Not applicable to this project because the assigned employees are below 500. The TMP for the 2008-9 NZP Master Plan accounts for this project's contribution to the overall NZP employee, visitor and volunteer transportation plan.

3.0 ENVIRONMENTAL DOCUMENTATION

NEPA Compliance
In accordance with the National Environmental Policy Act of 1969, the Smithsonian Institution has proposed a Master Plan and related Environmental Assessment study for the National Zoological Park. The EAS resulted in a Finding of No Significant Impact. This project conforms with the SI NZP Master Plan.

4.0 HISTORIC PRESERVATION DOCUMENTATION

Compliance
Refer to attached letter from the SI office of Architectural History and Historic Preservation (Appendix A) that cites this project will have no adverse effect on historic properties. The Section 106 process for this project has been approved and closed.

5.0 FLOOD PLAINS MANAGEMENT AND
WETLANDS PROTECTION

No Impact on Floodplain or Wetlands
Per FEMA's District of Columbia's Flood Insurance Rate Map (FIRM) panel 1100010016C (effective 9/27/2010), the project area is within Zone X, an area of minimal flood hazard. The project does not impact a wetlands area.

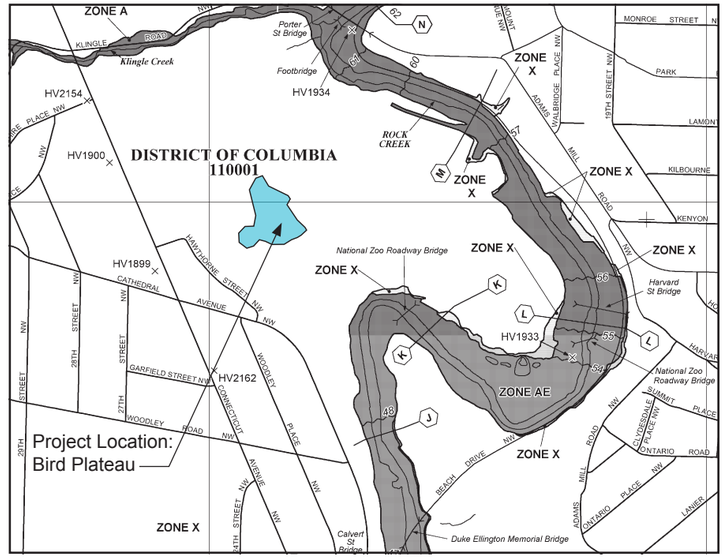
6.0 STORMWATER MANAGEMENT

The plan as designed complies with the District Department of Energy & Environment (DOEE) permit requirements for water quality and water quantity abatement and to the maximum extent practicable EISA 438. The project complies with DOEE by providing the required Stormwater Retention Volume (SWRv). The site has five proposed bioretention areas that provide 100% of the required SWRv. In addition, the project complies with DOEE Detention requirements by controlling the post-project discharge rates. Calculations and additional information can be found on the civil construction documents, sheets C501-C506, provided under separate cover.

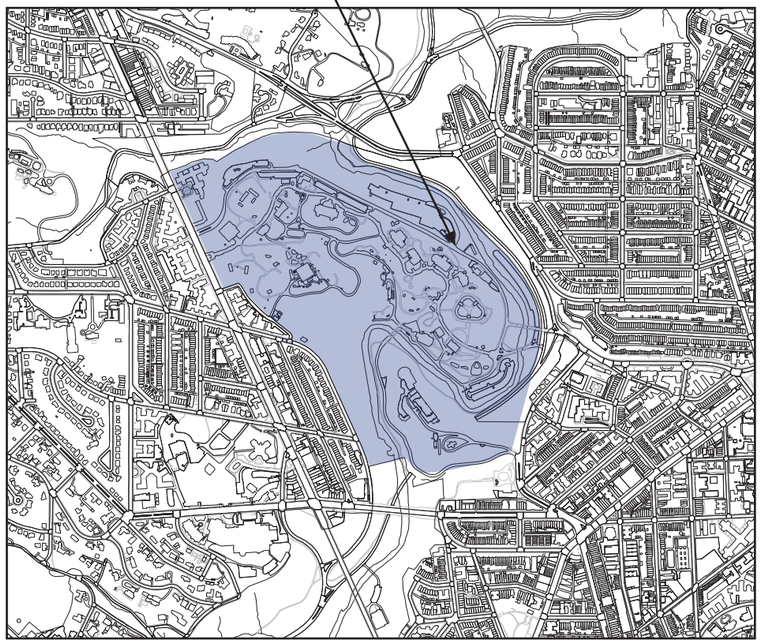
LEGEND

	SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
	OTHER FLOOD AREAS
ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
	OTHER AREAS
ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.

Refer to Appendix C for full FIRM panel 1100010016C.



N.T.S



VICINITY MAP N.T.S.

CONTEXT MAP

NORTH

National Zoo Context - Vicinity and Context Maps

AERIAL PHOTO OF PROJECT SITE

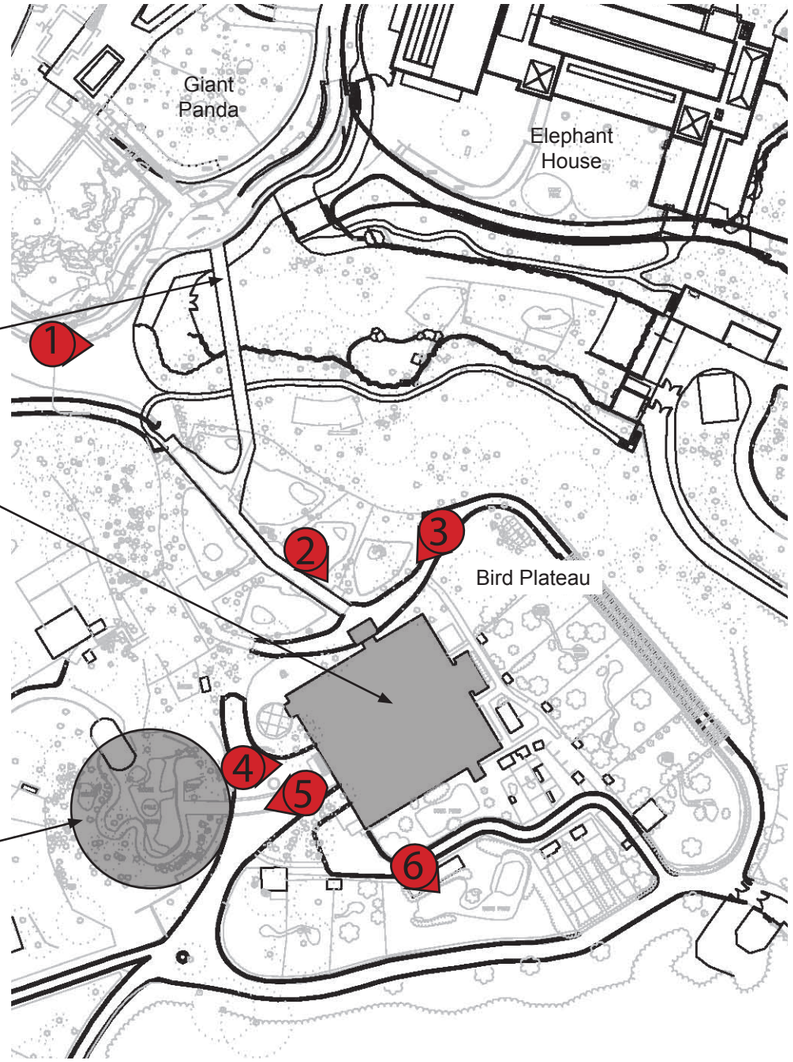


PHOTO KEY PLAN

NORTH

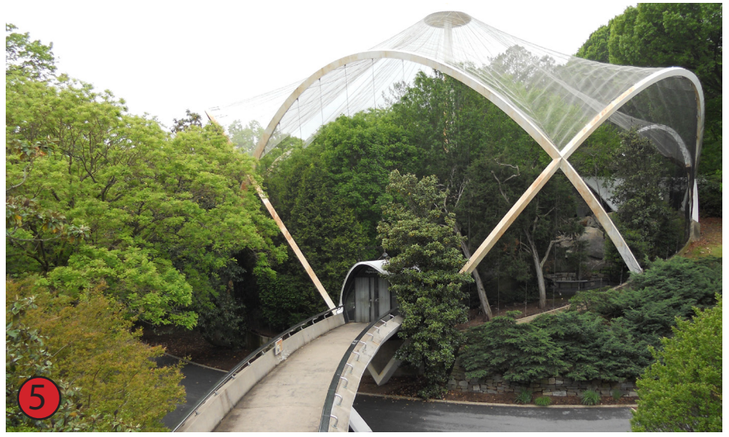
Project Context - Aerial Photo and Photo Key Plan

Birdhouse Bridge in Winter

Existing 1965 Entry and Bird House Building in Winter

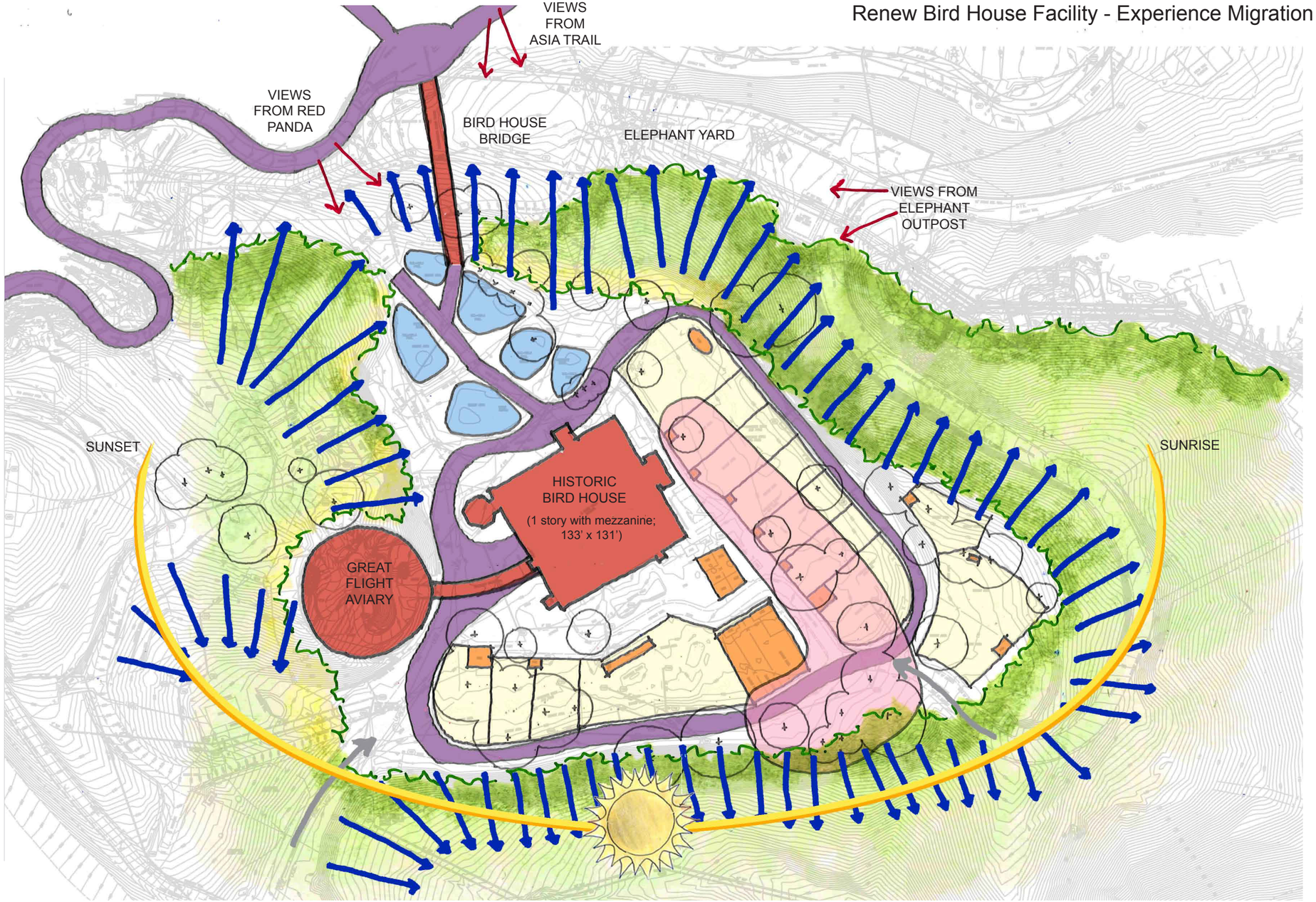
Existing 1965 Entry and Bird House Building beyond in Summer

Great Flight Aviary Bridge

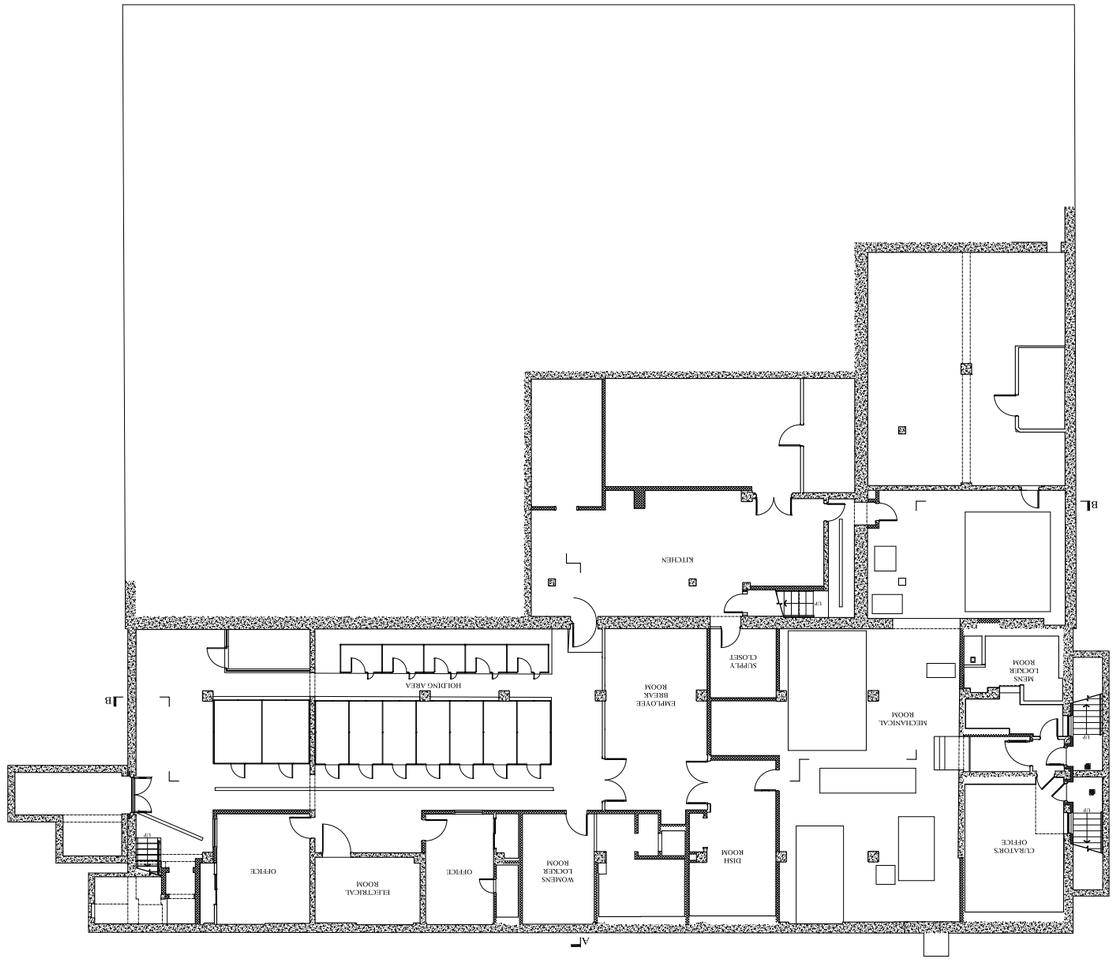


Great Flight Aviary and Entrance Bridge

Southern Concrete Trellis at animal yard; Existing to Remain



Existing Bird Plateau Site Plan



Existing Basement Plan

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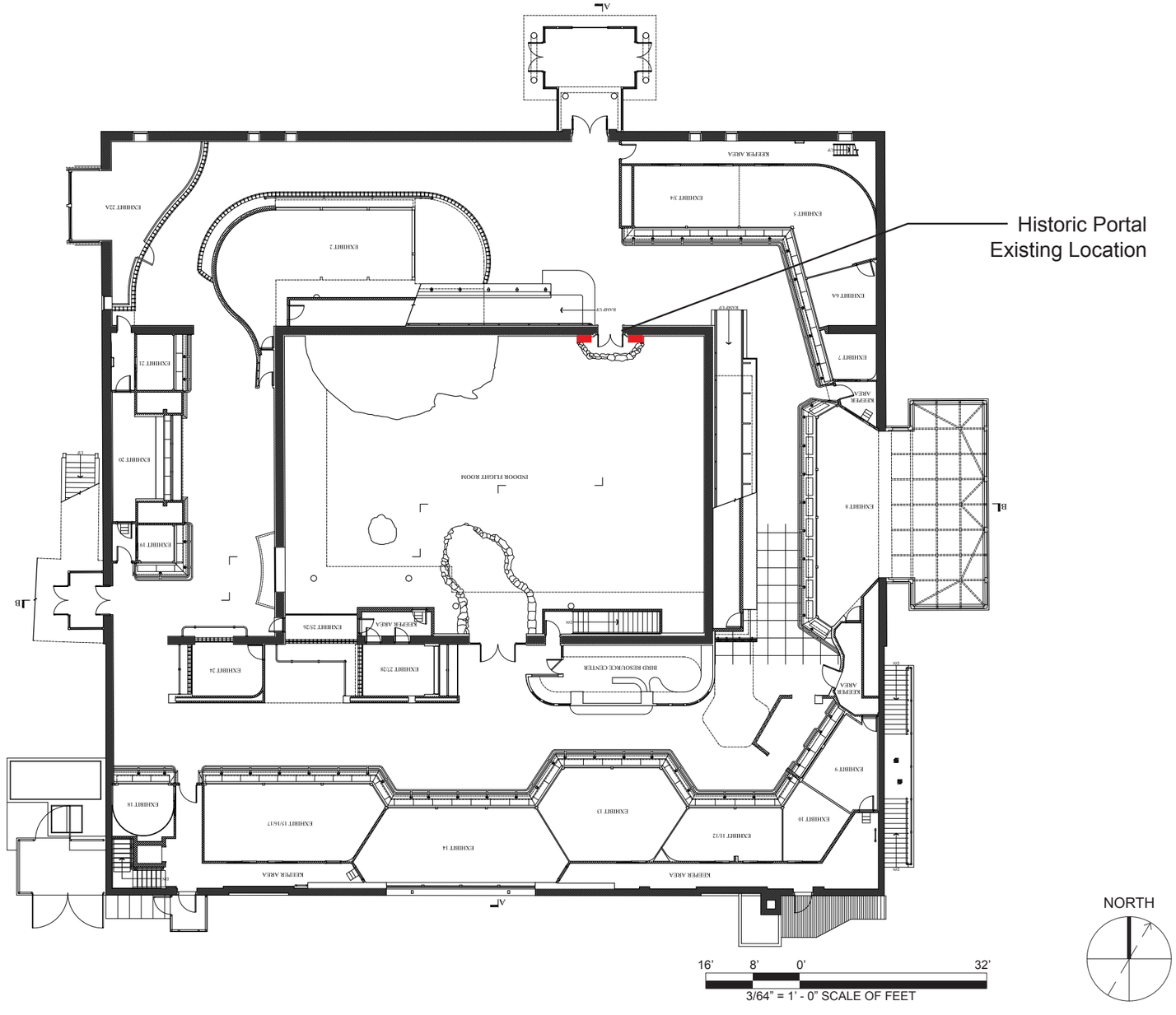
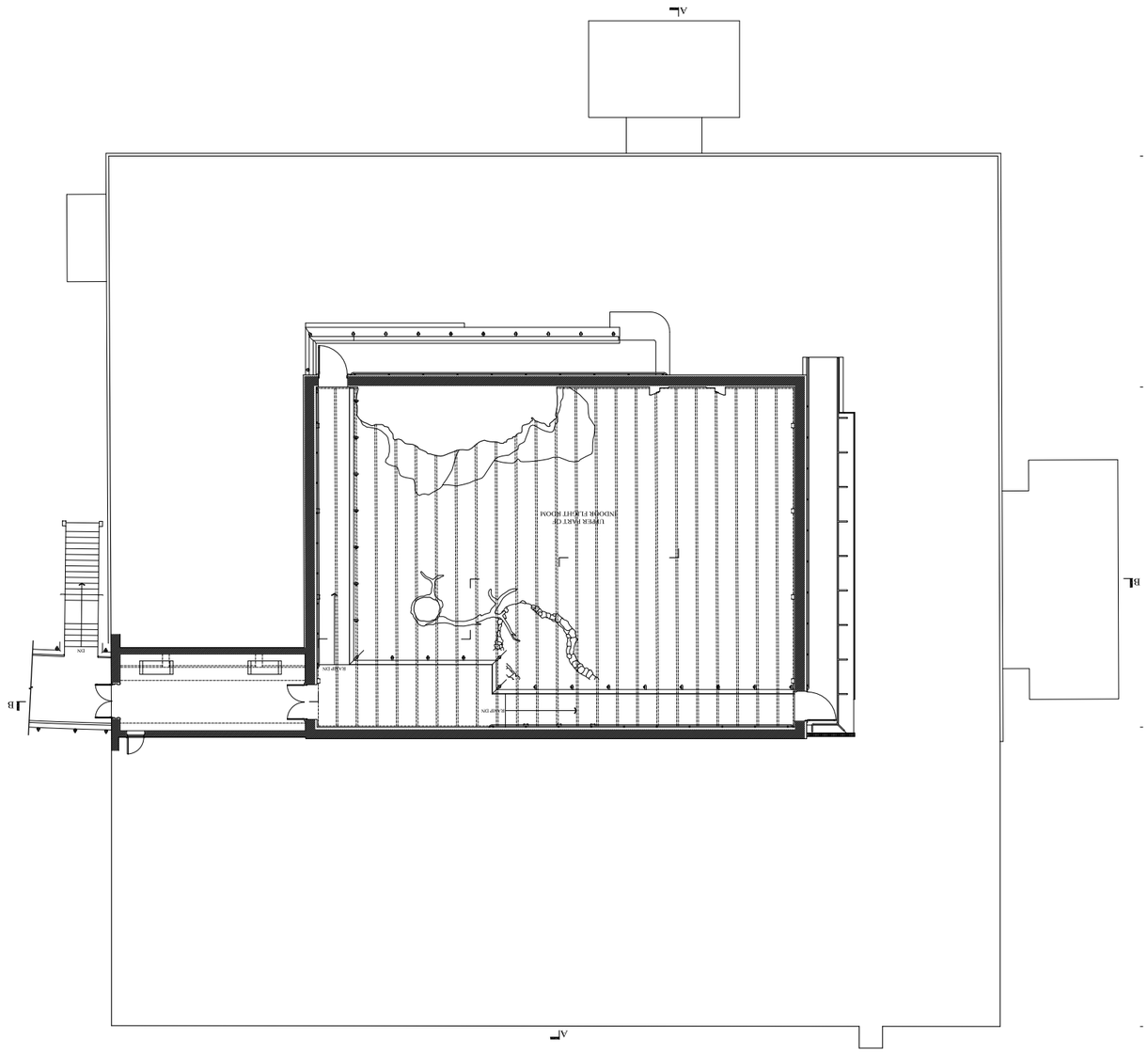
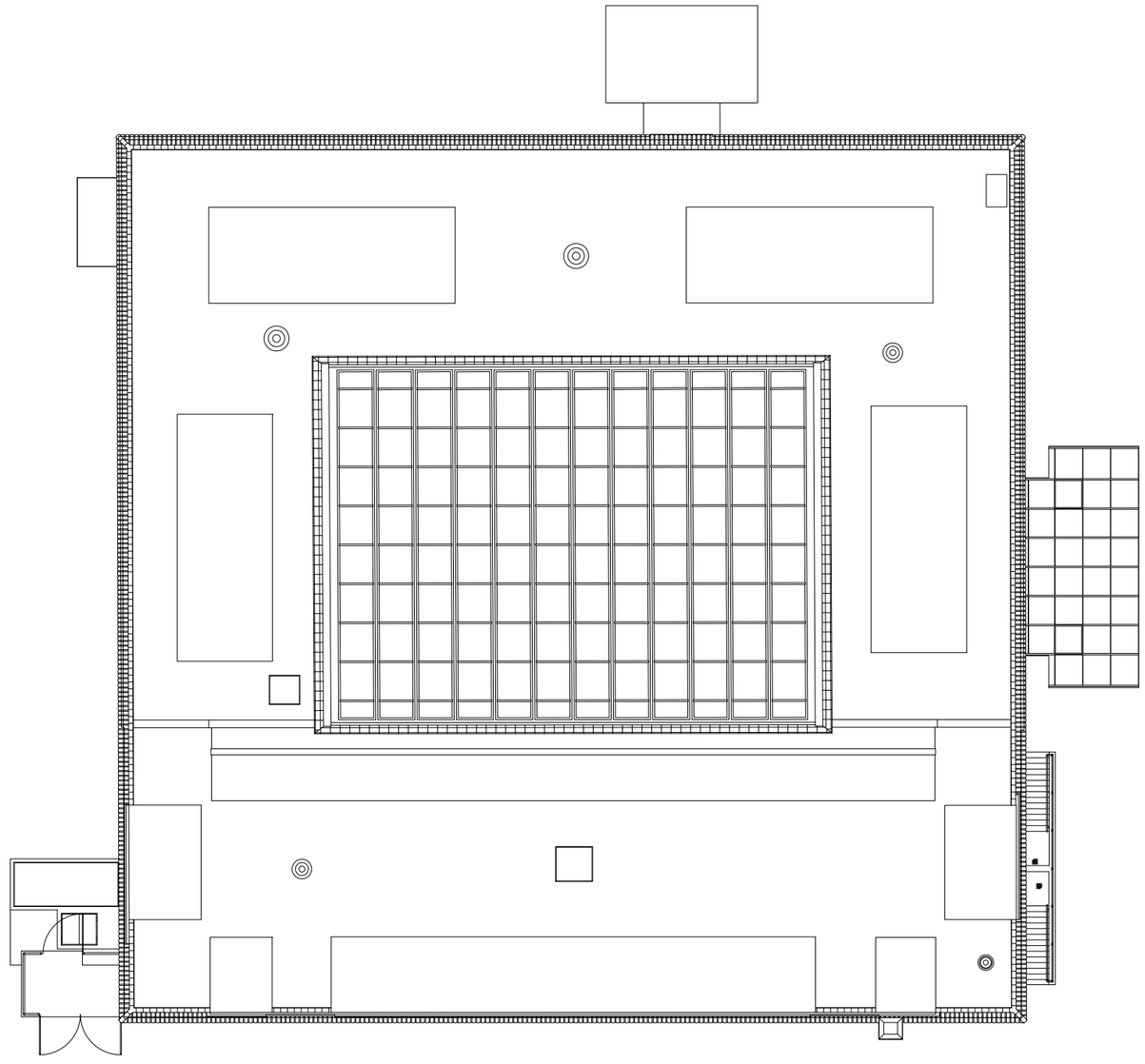


Existing First Floor Plan



Existing Mezzanine Plan



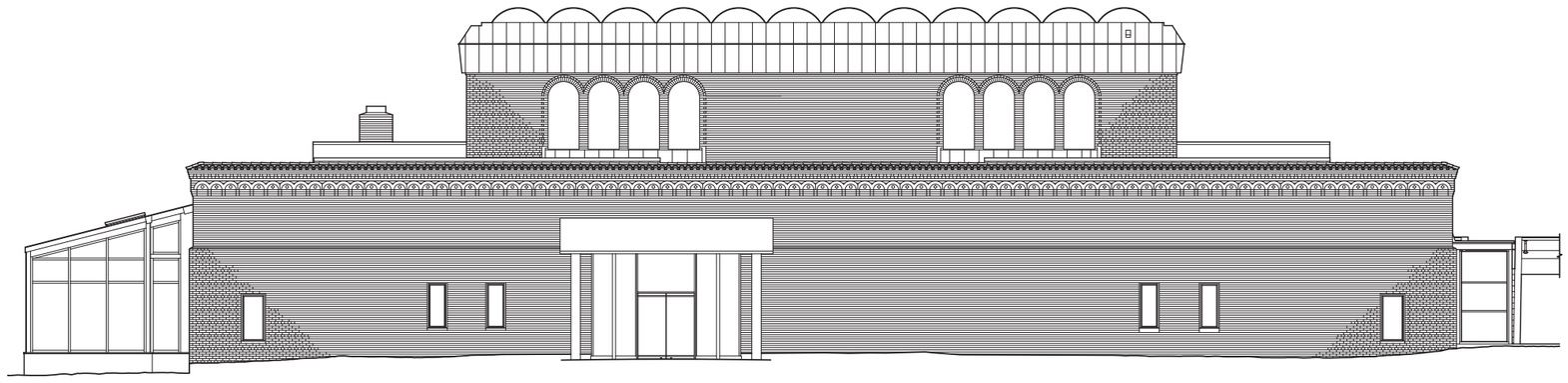
16’ 8’ 0’ 32’
3/64” = 1’ - 0” SCALE OF FEET

NORTH

Roof Plan

Smithsonian
National Zoological Park

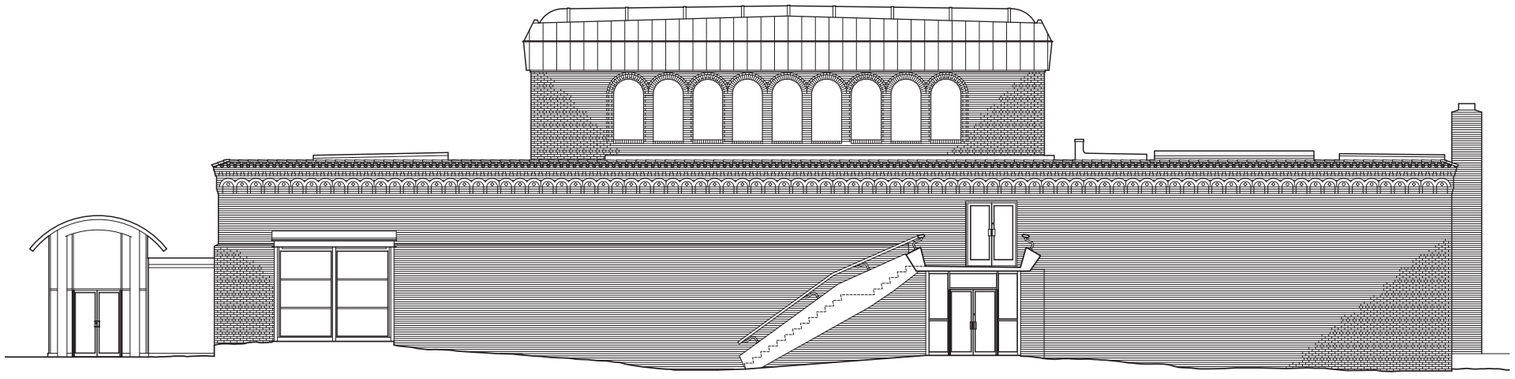
EXISTING WEST ELEVATION



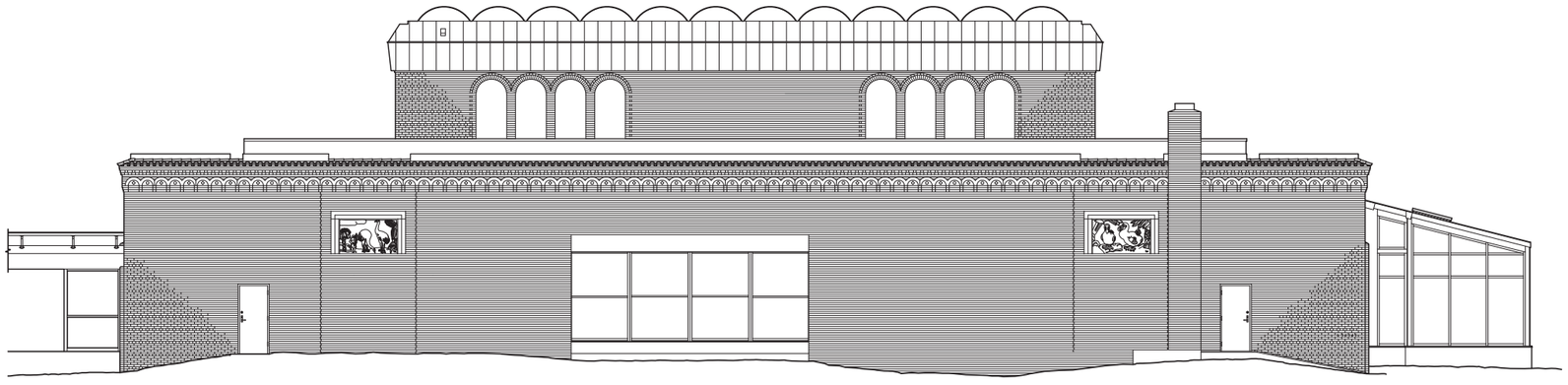
EXISTING NORTH ELEVATION

8’ 0’ 16’
1/16” = 1’ - 0” SCALE OF FEET

Existing Elevations - North and West



EXISTING EAST ELEVATION



EXISTING SOUTH ELEVATION

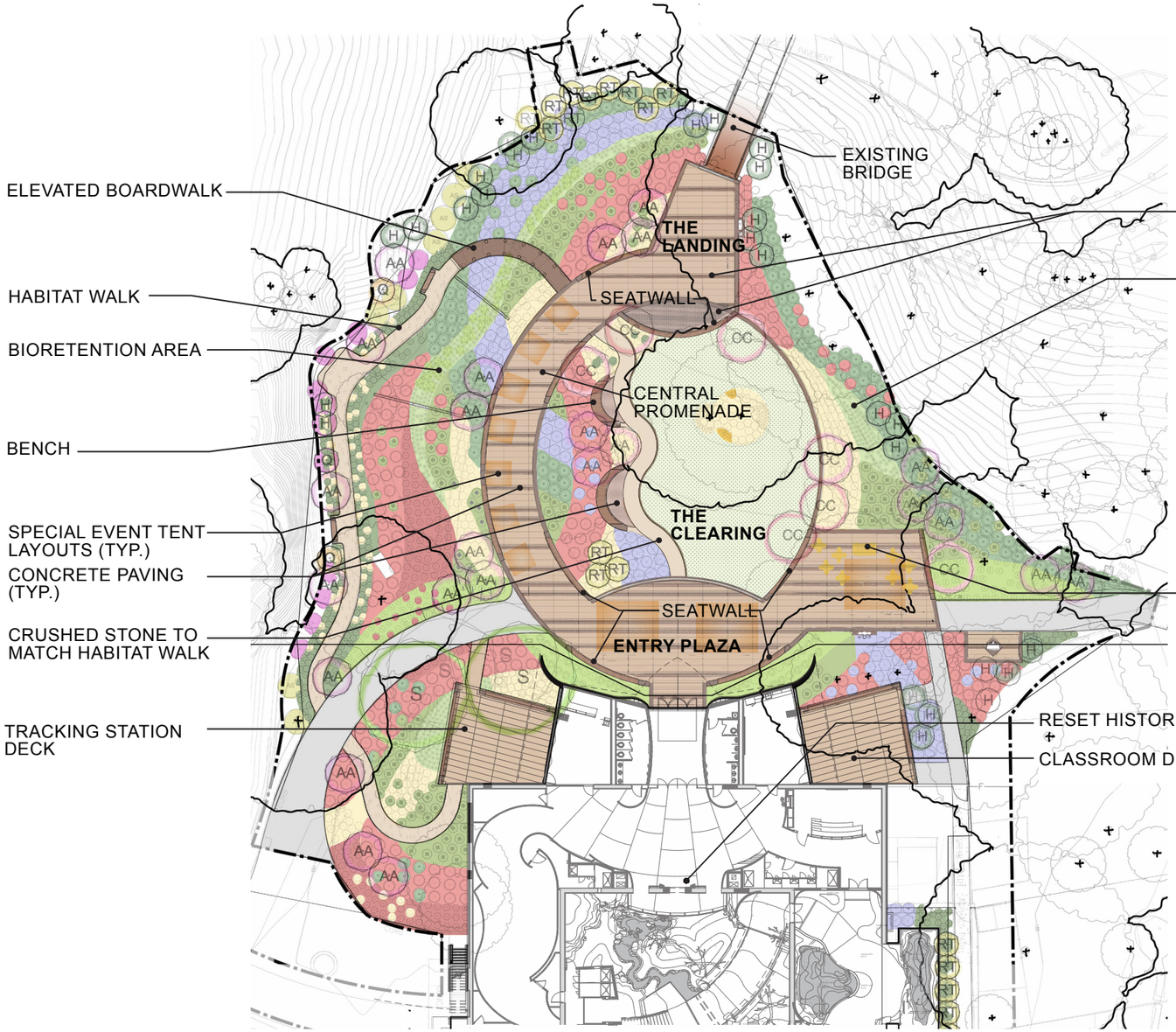
8’ 0’ 16’
1/16” = 1’ - 0” SCALE OF FEET

Existing Elevations - South and East

Renew Bird House Facility - Experience Migration on Bird Plateau

- Improve wayfinding
- Reimagine a gracious arrival experience with critical program space
- Create bird-friendly habitat
- Address stormwater on site
- Introduce a new Bird House building entry
- Incorporate unique learning opportunities
- Provide accessibility throughout public areas
- Create state of the art interactive exhibits
- Introduce walk-through aviary habitats
- Revitalize animal care and health
- Improve natural light and ventilation
- Update life safety systems
- Replace outdated systems and equipment with efficient solutions

NORTH

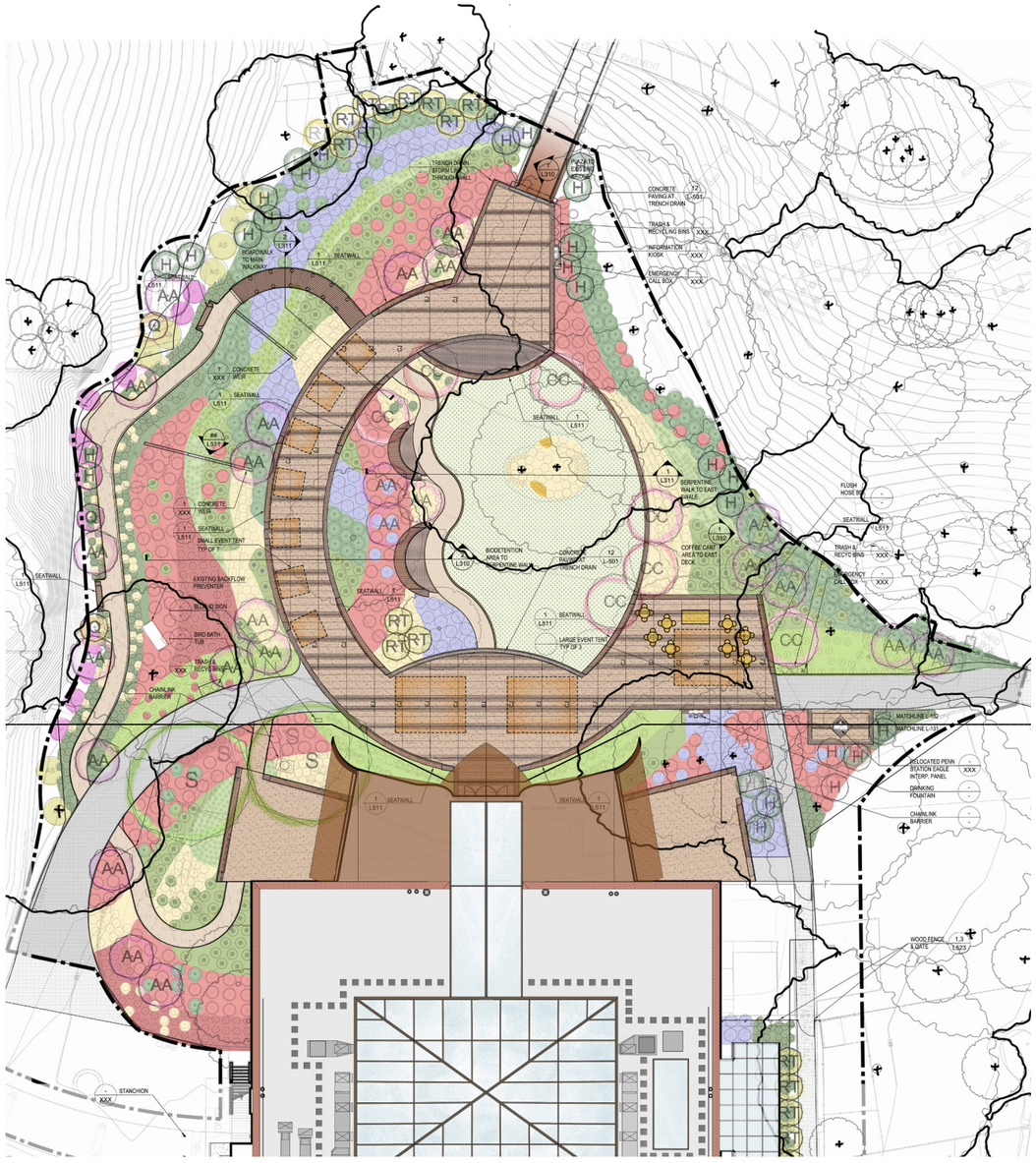


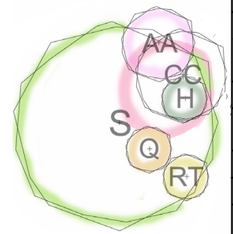
NOTE:

SEE CONSTRUCTION DOCUMENTS SERIES L-500 FOR ADDITIONAL INFORMATION REGARDING DETAILS ON PAVING CONDITIONS, EDGE CONDITIONS, BENCH DETAILS, AND RAILINGS.

0' 8' 16' 32' 64'

Layout Plan - North Entry





PLANT SCHEDULE - TREES	
COMMON NAME	SCIENTIFIC NAME
DOWNY SERVICEBERRY	Amalanchier arborea
REDBUD	Cercis canadensis
WITCH HAZEL	Hamamelis virginiana
BLACK TUPELO	Nyssa sylvatica
DWARF CHESTNUT OAK	Quercus prinoides
STAGHORN SUMAC	Rhus typhina

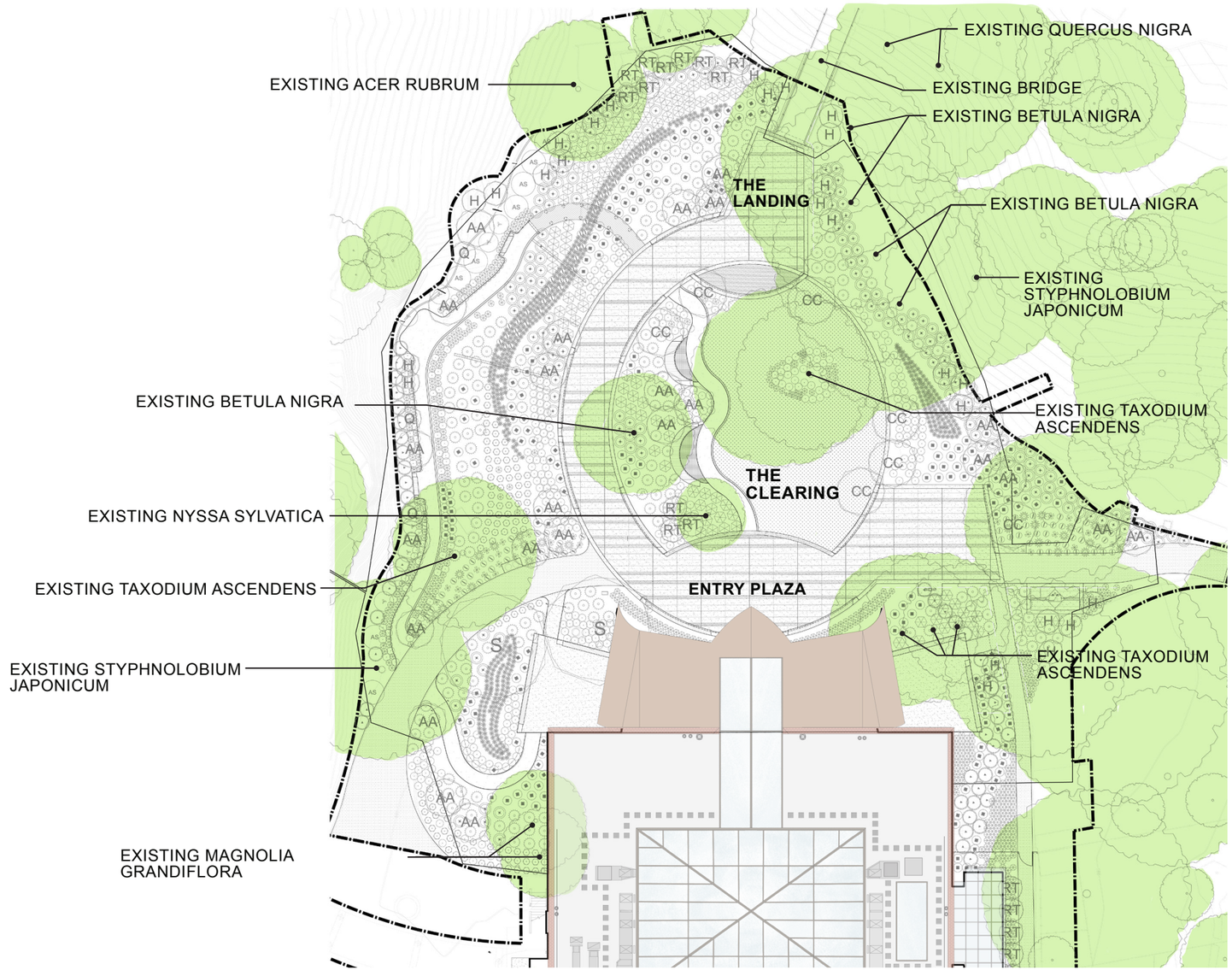
PLANT SCHEDULE - SHRUBS	
COMMON NAME	SCIENTIFIC NAME
SMOOTH ALDER	Alnus serrulata
ISANTI REDTWIG DOGWOOD	Cornus sericea 'Isanti'
EVERGREEN WOODFERN	Dryopteris intermedia
INKBERRY	Ilex glabra
WINTERBERRY	Ilex verticillata
STEEPLEBUSH	Spirea tomentosa
STEEPLEBUSH	Spirea tomentosa
HIGHBUSH BLUEBERRY	Vaccinium corymbosum 'Legacy'
AMERICAN CRANBERRY BUSH	Viburnum trilobum

PLANT SCHEDULE - GRASSES	
REED GRASS	Calamagrostis acutiflora 'Karl Foerster'
PENNSYLVANIA SEDGE	Carex pennsylvanica
SWITCH GRASS	Panicum virgatum 'Shenandoah'

PLANT SCHEDULE - PERENNIALS	
COMMON NAME	SCIENTIFIC NAME
GOAT'S BEARD	Aruncus dioicus
BEEBALM	Monarda didyma 'Marshall's Delight'
BLACK-EYED SUSAN	Rudbeckia hirta
IRONWEED	Veronia noveboracensis

	SOD LAWN	SEE SPECIFICATIONS
	HYDROSEEDED LAWN	SEE SPECIFICATIONS

0' 8' 16' 32' 64'



The revitalization of the North site on Bird Plateau is designed to weave together a transformative visitor experience within an enhanced forest edge. A native bird-friendly landscape will be established throughout the site from the landing to the Bird House, providing an immersive setting for education about local bird habitats.

To support the understory that occurs at the ecotone of a forest and clearing, and to insure the long term health of the north site trees, selective tree removal will be necessary. By opening the canopy the design provides a balance of sun and shade, allowing for vital sun-loving bird- and pollinator-friendly plantings and bioretention features, all while maintaining the lush character of the existing Plateau.

An estimated 340 caliper inches of trees are to be removed. The caliper inches of new trees to be established equals 264. Smaller caliper sized trees are proposed to be planted to ensure quicker establishment and long-term survivability.

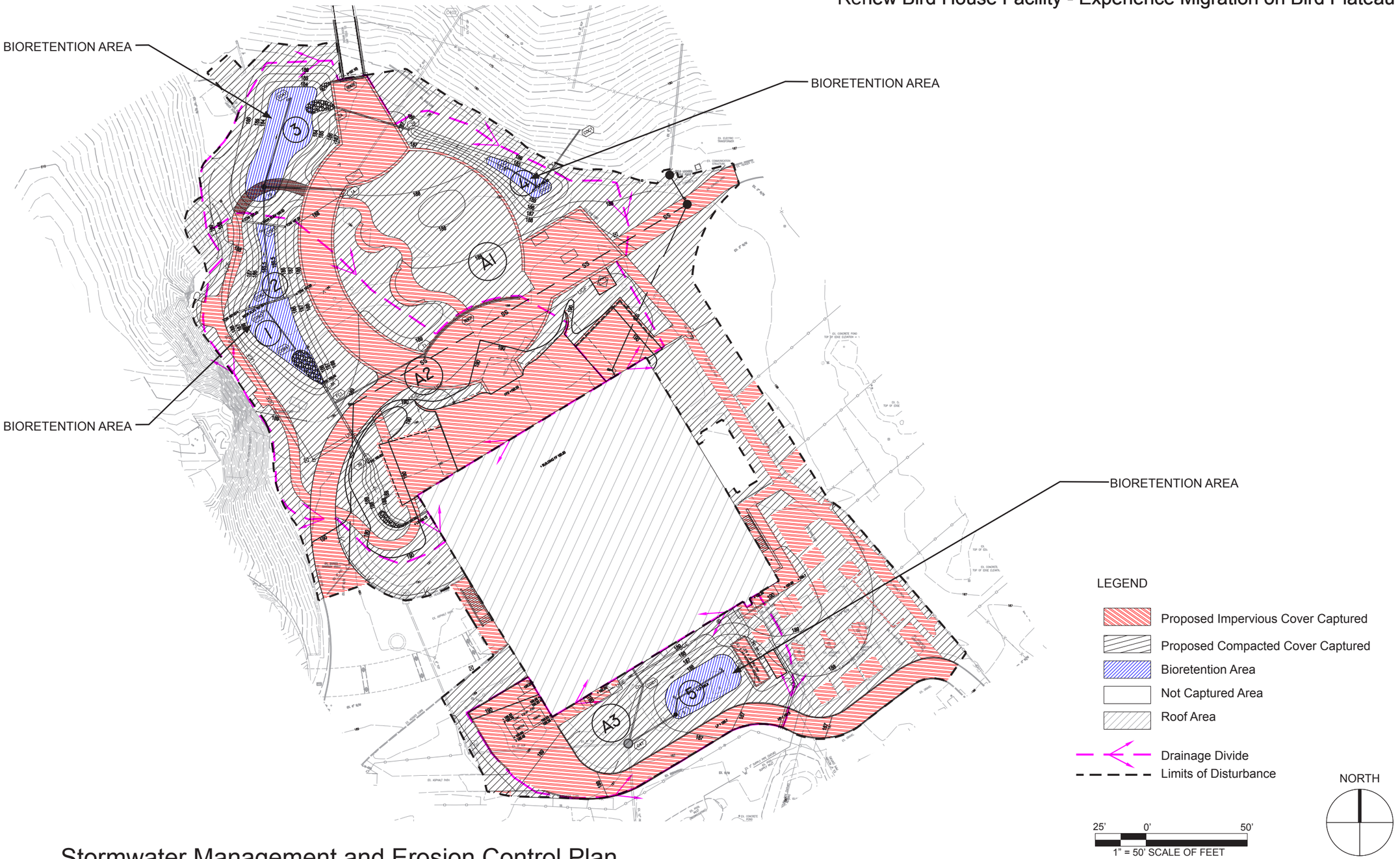
Existing trees within the north site were surveyed and evaluated by a professional arborist and NZP horticultural staff to determine health, hardiness, and possible hazards. Based on the survey and evaluation, the team identified a tree preservation plan.

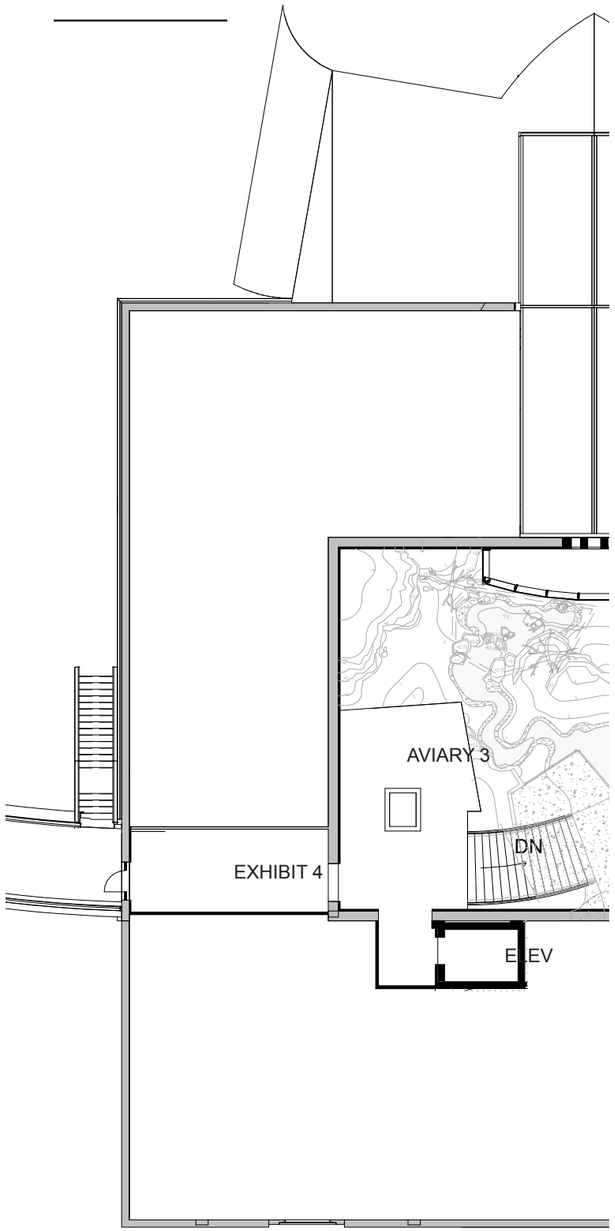
The result is a balanced ecologically friendly landscape that provides the successional edge habitat critical for birds and pollinators within an immersive and educational visitor experience.

LEGEND

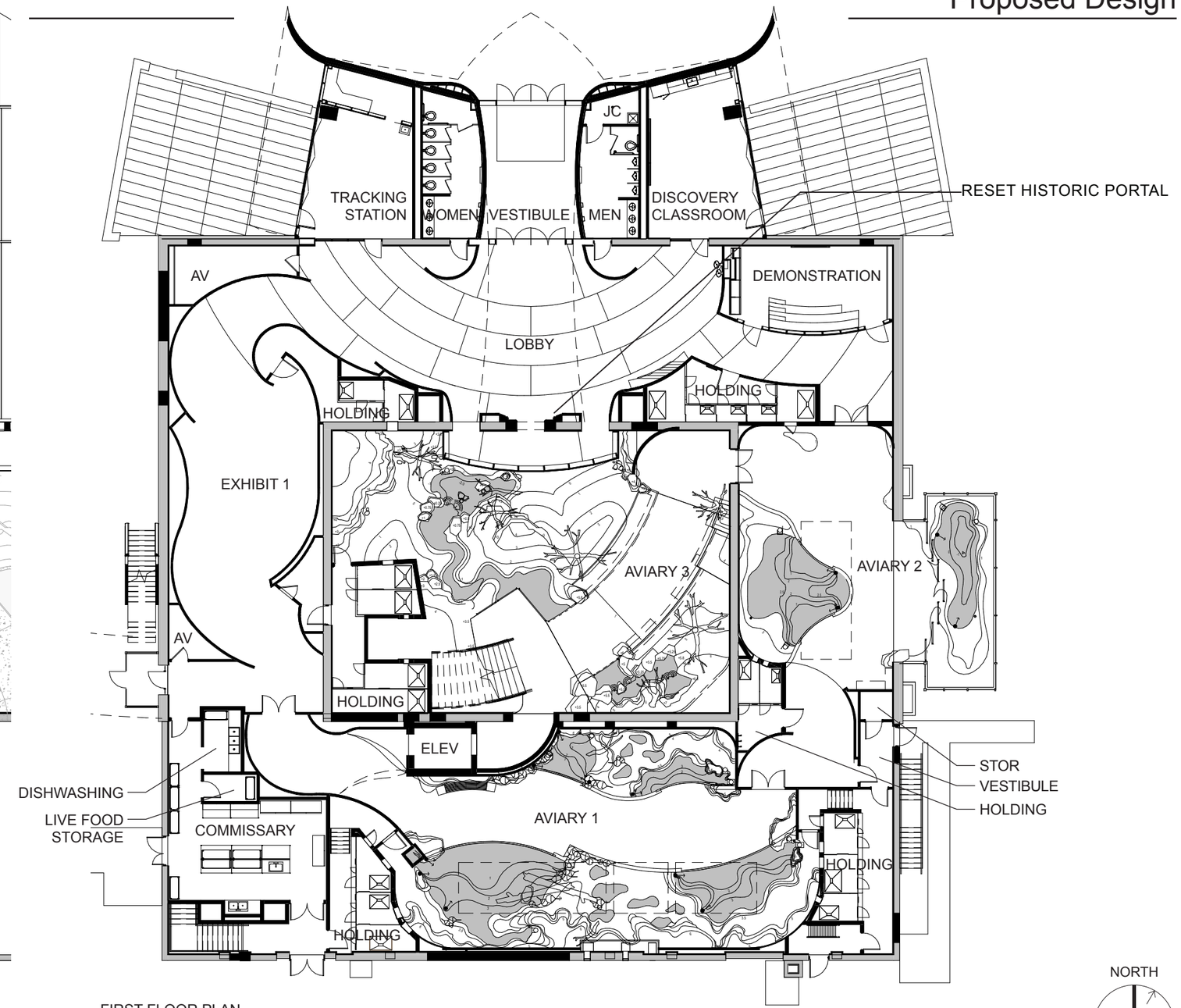
- EXISTING CONTOUR
- PROPOSED CONTOUR MAJOR (5FT INTERVAL) MINOR (1FT INTERVAL)
- + 188.00 SPOT ELEVATION
- + TW 188.00 TOP OF WALL ELEVATION
- + BW 188.00 BOTTOM OF WALL ELEVATION
- +INV 188.00 CULVERT INVERT ELEVATION
- SWALE LINE
- 3:1 SLOPE
- + HP 188.00 HIGH POINT
- + LP 180.00 LOW POINT
- LIMIT OF WORK

Grading Plan - North Entry


BIORETENTION AREA
BIORETENTION AREA
BIORETENTION AREA
BIORETENTION AREA
A1
A2
A3
1
2
3
5
LEGEND
Proposed Impervious Cover Captured
Proposed Compacted Cover Captured
Bioretention Area
Not Captured Area
Roof Area
Drainage Divide
Limits of Disturbance
NORTH
25’ 0’ 50’
1” = 50’ SCALE OF FEET

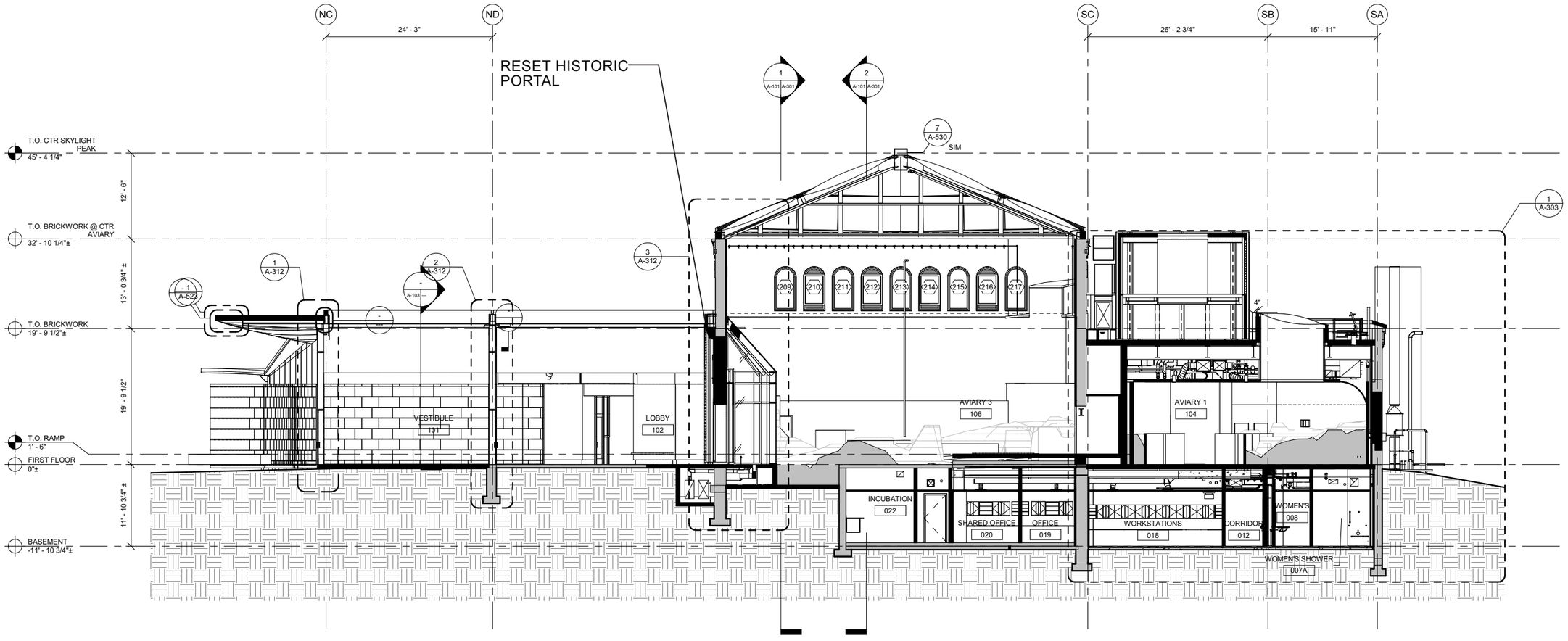


UPPER MEZZANINE PLAN



FIRST FLOOR PLAN

First Floor and Upper Mezzanine Plan



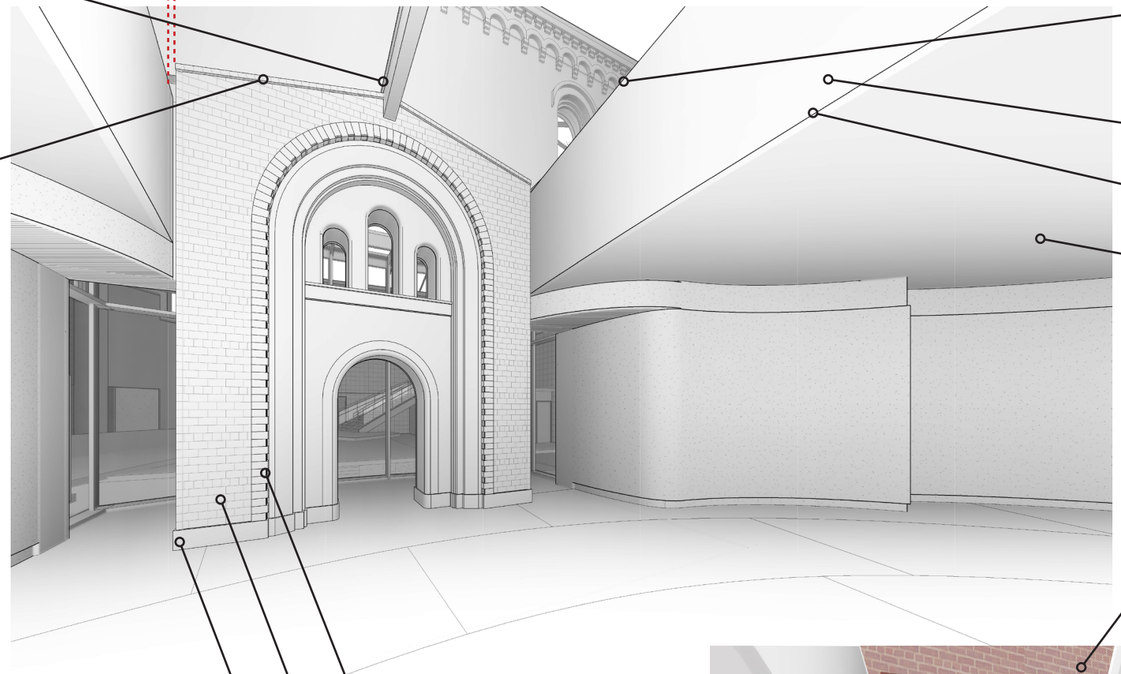
N-S Section Looking East - Aviary 3

Lobby Perspective - Historic Portal

TUBE STEEL BEAM, ENCASED IN ALUCOBOND.

5” REVEAL

GABLE AS BRICK ON END, WITH 1” PROTRUSION.



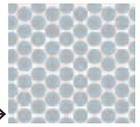
CONTINUOUS CURVE WALL.

ACOUSTIC PLASTER WALL.

CURVED METAL EDGE BEAD.

ACOUSTIC PLASTER CEILING.

BRICK SAMPLE AT EXISTING BRICK WALL.

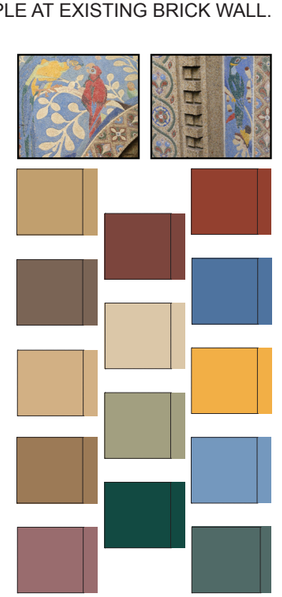


ETFE FRIT PATTERN

ARCH AS SOLDIER COURSE.

BRICK VENEER WITH COURSING TO MATCH EXISTING.

CONTINUOUS STONE BASE.

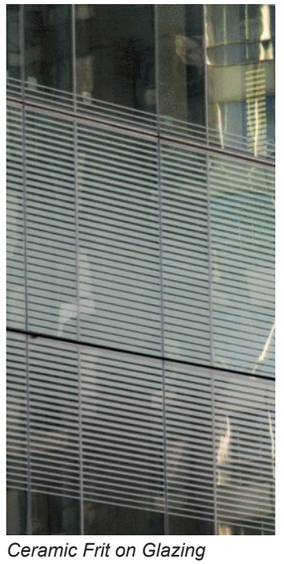


COLORS FROM HISTORIC MASONRY ARCH.

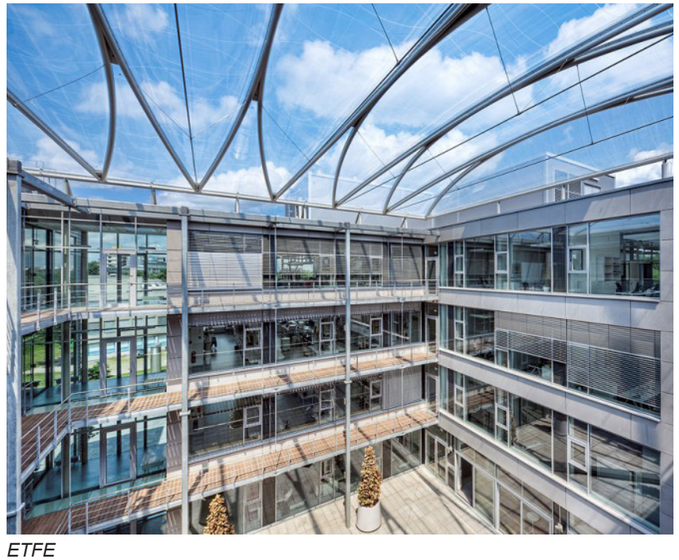
Historic Portal Perspective - Brick Surround

Sand Hill Crane Feathers

Smithsonian National Zoological Park Bird House - Existing Brick

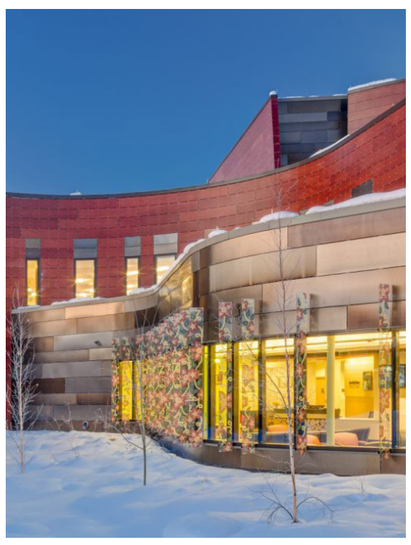


Ceramic Frit on Glazing

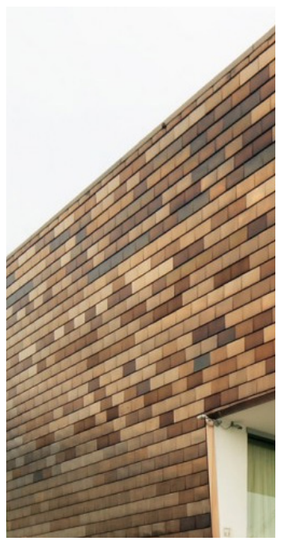


ETFE

Metal Panel - Flat Lock Installation

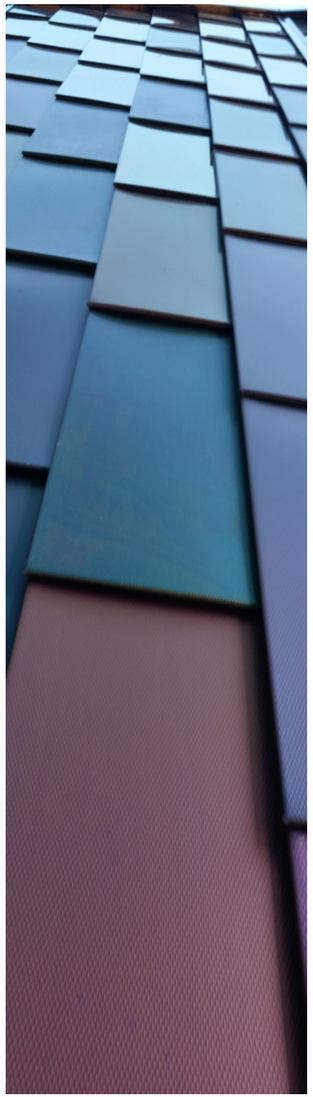


Metal Panel - Flush Joint

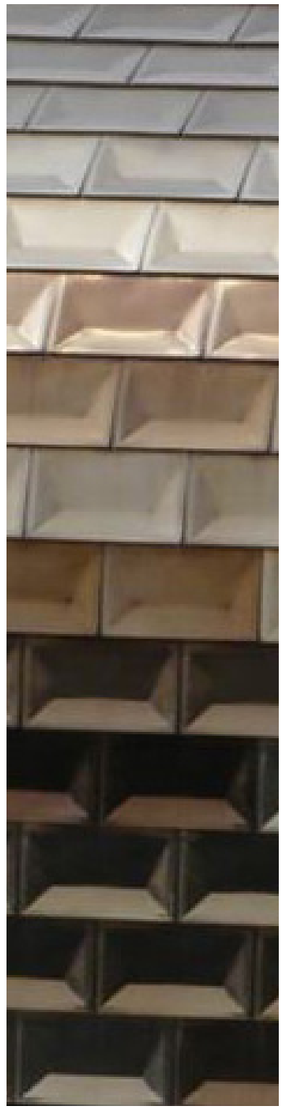


Metal Tile - Lapped Shingle Installation

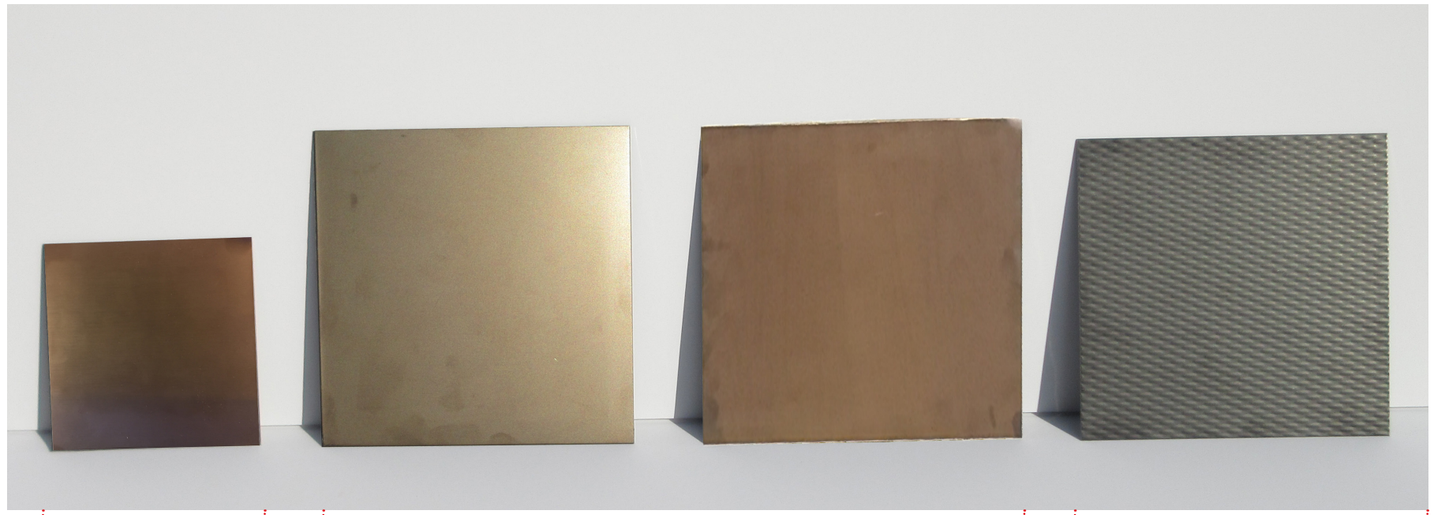
Metal Panel - Flat Lock Installation



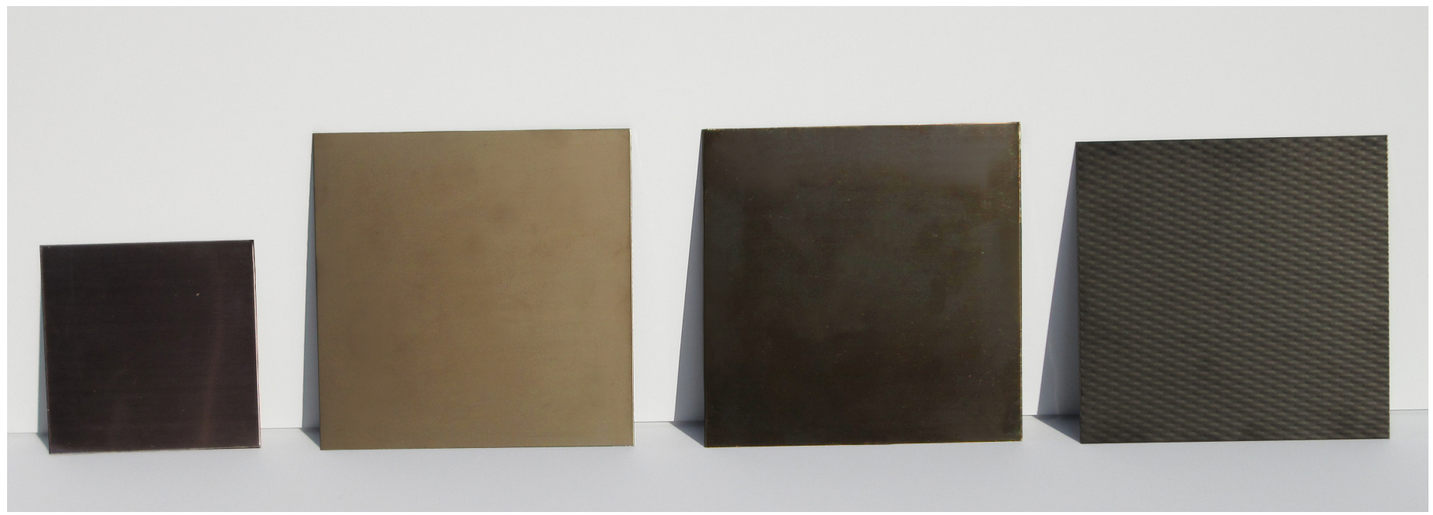
PRECEDENT -
FOR PROFILE ONLY



PRECEDENT -
FOR COLOR ONLY



TiNi PERMANENT COPPER | BRONZE GOLD - LIGHT | BRONZE GOLD - DARK | BRONZE - with 5WL Embossing



SAMPLES - SAME COLORS UNDER DIFFERENT LIGHT CONDITIONS

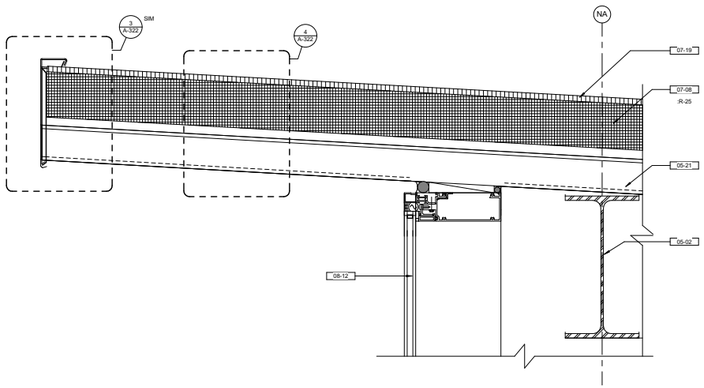
Proposed Materials - Daylit Color Ranges

View Looking South From Bridge

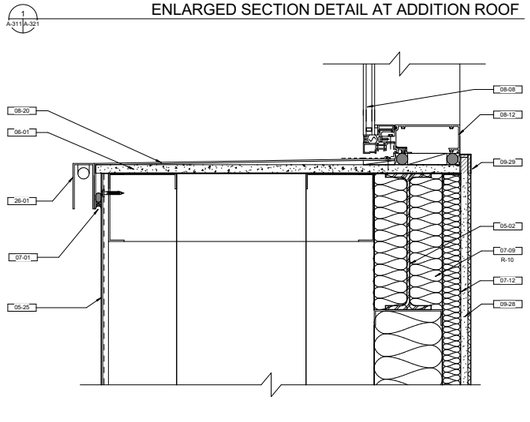
View Looking South From Bridge (No Trees)

View Looking Southeast Toward Building Entry

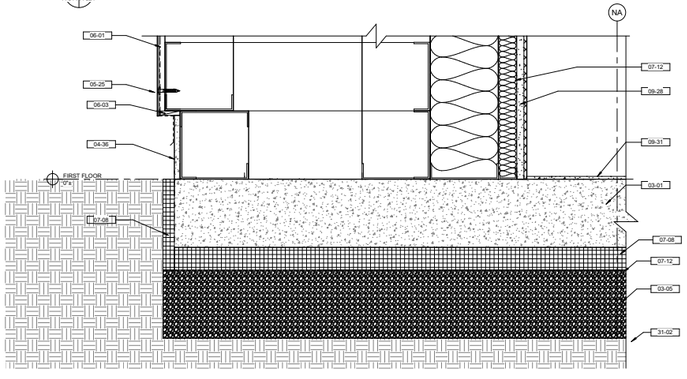
View Looking Southeast Toward Building Entry (No Trees)



ENLARGED SECTION DETAIL AT ADDITION ROOF



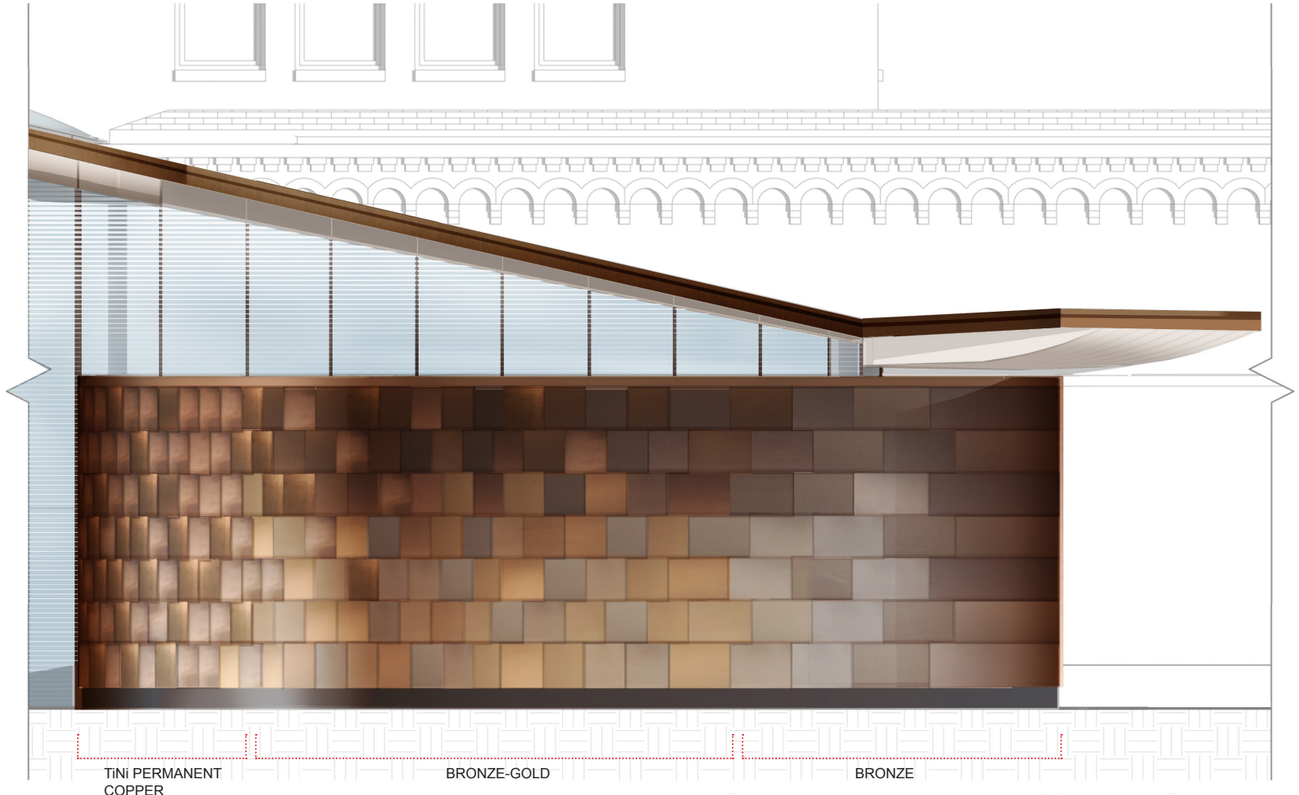
ENLARGED SECTION DETAIL AT TOP OF ADDITION WALL



ENLARGED SECTION DETAIL AT ADDITION FLOOR

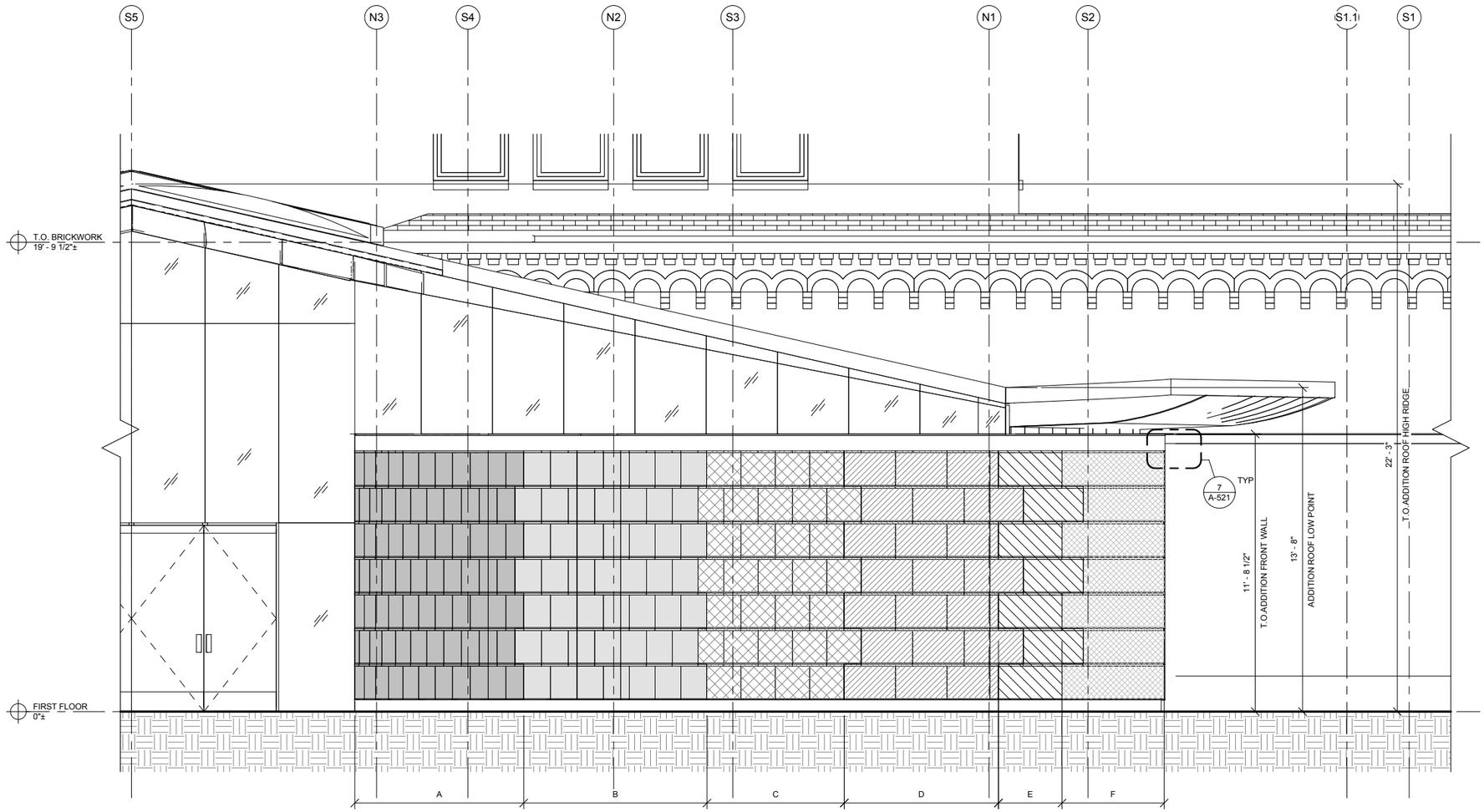
KEYNOTES

02-04	Existing wall to remain.
03-01	Provide concrete slab. Refer to structural dwgs.
03-05	Provide gravel fill.
04-36	Provide stone wall base
05-02	Provide steel beam. Refer to structural dwgs.
05-21	Provide steel roof deck. Refer to structural dwgs
05-25	Provide metal panel system
06-01	Provide 3/4" plywood sheathing.
06-03	Provide wood blocking.
07-01	Provide sealant w/ backer rod
07-08	Provide rigid insulation.
07-09	Provide thermal batt insulation.
07-12	Provide vapor barrier.
07-19	Provide protection board.
07-26	Provide termination bar with fasteners spaces 12" o.C.
07-50	Provide feltback adhered pvc roofing membrane 90ml
07-67	Provide pvc roofing stop and fasteners
08-08	Provide glazing.
08-12	Provide glazed curtain wall system.
08-20	Provide extruded aluminum flashing
09-28	Provide scheduled partition
09-29	Provide continuous finish
09-31	Provide scheduled floor
26-01	Provide light fixture. Refer to elec. Drawings.
31-02	Earth



Representative Illustration of Proposed Elevation

Typical Section and Elevation of Metal Panel Wall



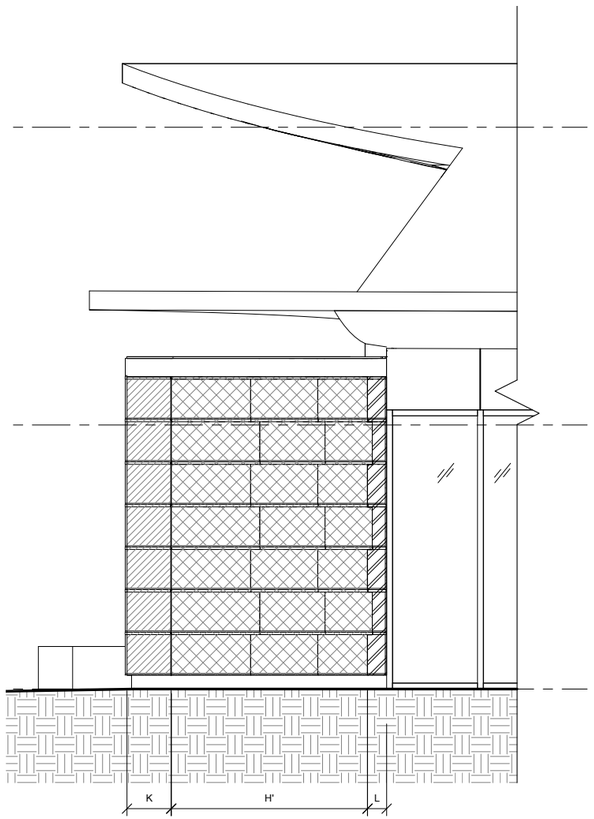
LEGEND

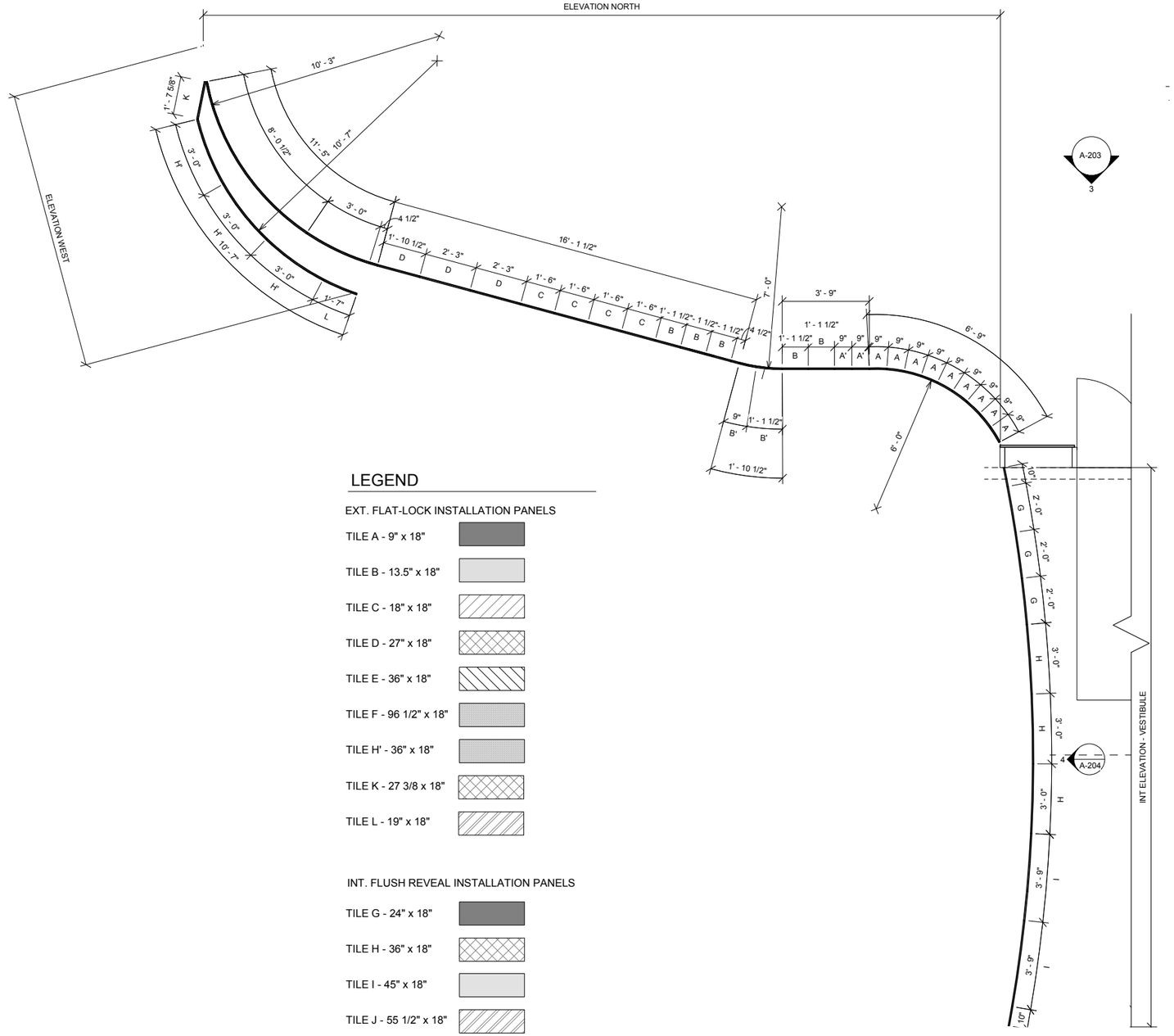
EXT. FLAT-LOCK INSTALLATION PANELS

- TILE A - 9" x 18"
- TILE B - 13.5" x 18"
- TILE C - 18" x 18"
- TILE D - 27" x 18"
- TILE E - 36" x 18"
- TILE F - 112" x 18"
- TILE K - 27 3/8 x 18"
- TILE L - 32 1/2" x 18"

INT. FLUSH REVEAL INSTALLATION PANELS

- TILE G - 24" x 18"
- TILE H - 36" x 18"
- TILE I - 45" x 18"
- TILE J - 55 1/2" x 18"





LEGEND

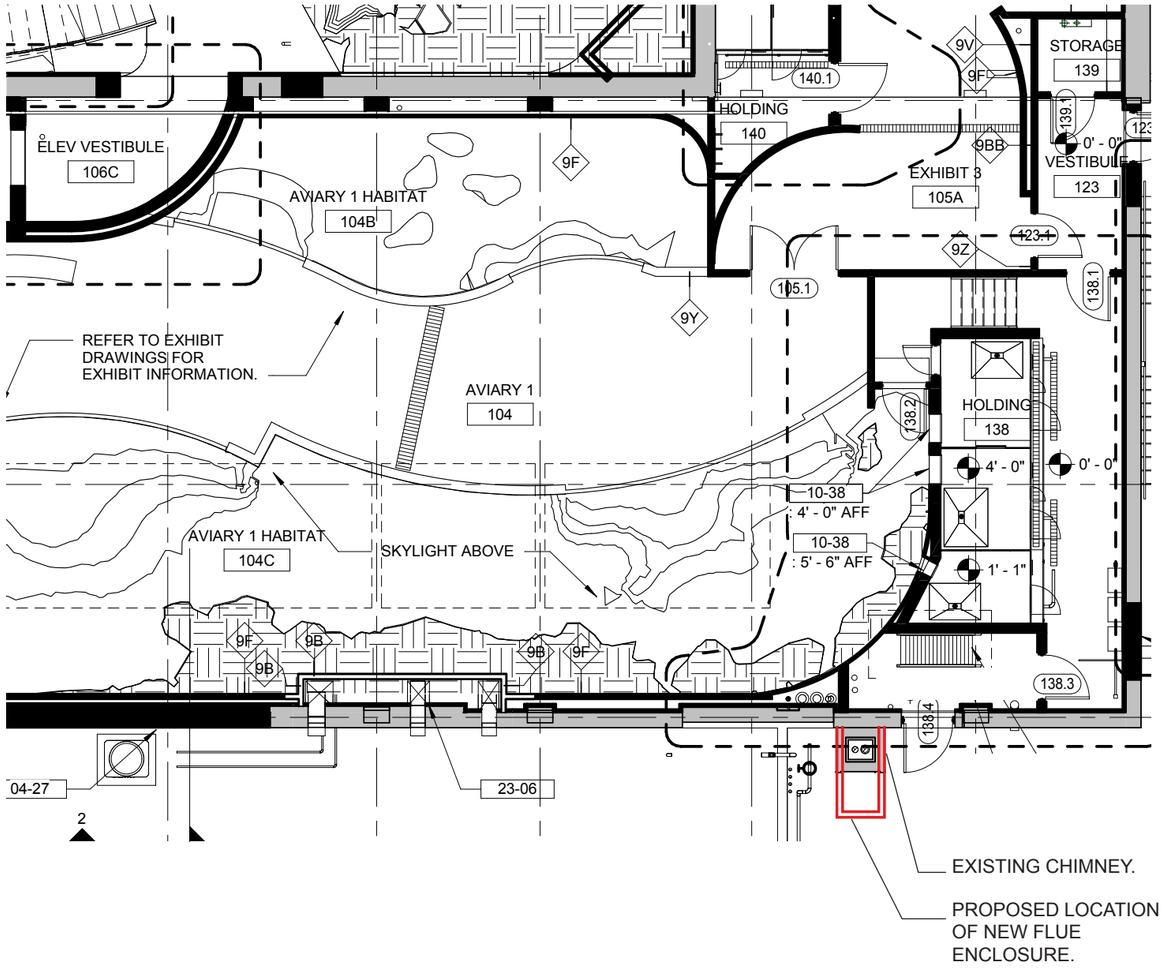
EXT. FLAT-LOCK INSTALLATION PANELS

- TILE A - 9" x 18"
- TILE B - 13.5" x 18"
- TILE C - 18" x 18"
- TILE D - 27" x 18"
- TILE E - 36" x 18"
- TILE F - 96 1/2" x 18"
- TILE H' - 36" x 18"
- TILE K - 27 3/8 x 18"
- TILE L - 19" x 18"

INT. FLUSH REVEAL INSTALLATION PANELS

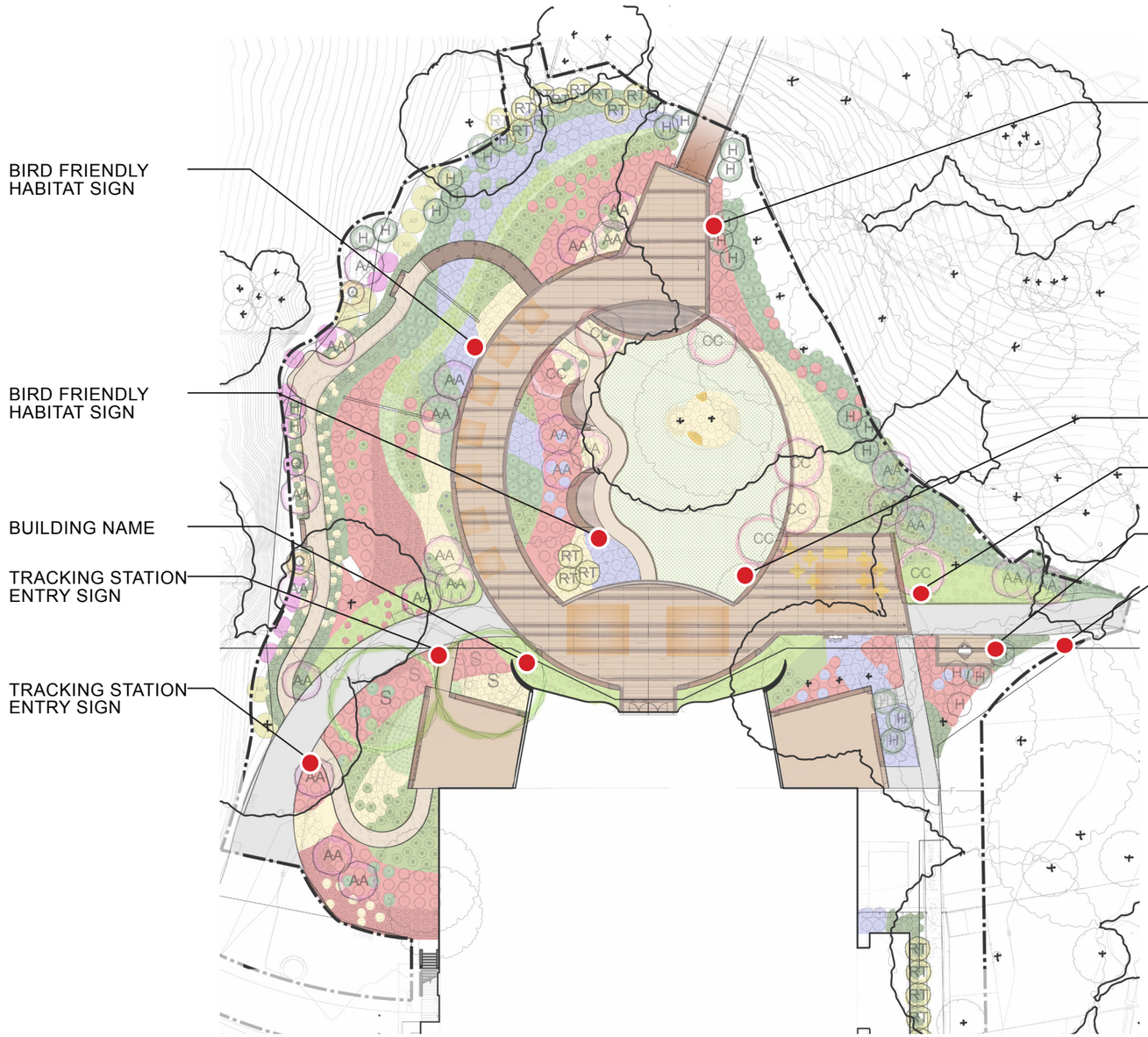
- TILE G - 24" x 18"
- TILE H - 36" x 18"
- TILE I - 45" x 18"
- TILE J - 55 1/2" x 18"

Renew Bird House Facility - Experience Migration on Bird Plateau



NORTH

First Floor Plan - Addition of New Flue Enclosure


BIRD FRIENDLY HABITAT SIGN
BIRD FRIENDLY HABITAT SIGN
BUILDING NAME
TRACKING STATION ENTRY SIGN
TRACKING STATION ENTRY SIGN
DIGITAL INFORMATION KIOSK
BIRD FRIENDLY COFFEE SIGN
TRASH & RECYCLING CONSERVATION SIGNS
PENN STATION EAGLE SIGN
INFORMATION MAP
LEGEND
PROPOSED SIGN LOCATION WITH SIGN DESCRIPTION

PRECEDENT: BUILDING NAME MOUNTED ON BUILDING.

PRECEDENT: EXHIBIT OR BUILDING NAME MOUNTED IN LANDSCAPE.


WAYFINDING - NZP STANDARD DIGITAL INFORMATION KIOSK.


WAYFINDING - NZP STANDARD DIGITAL INFORMATION KIOSK.

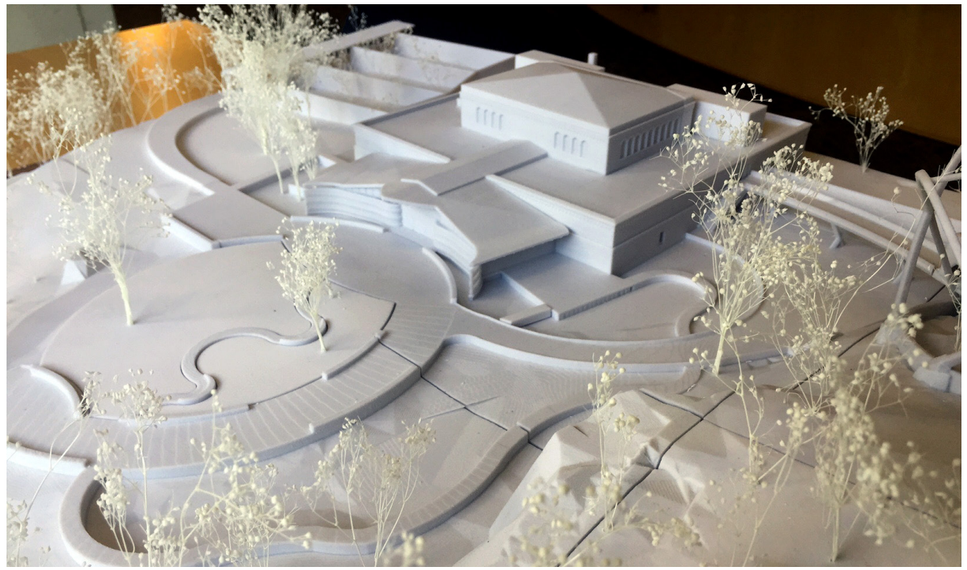
NZP STANDARD RECYCLING AND TRASH CANS WITH CONSERVATION MESSAGING SIGNS.

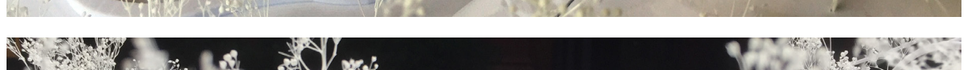
This family of signs represents the design aesthetic that will be carried through Experience Migration within Bird House and around the Bird Plateau site.

Outdoor signs will be mounted on railings or on posts within the landscape to interpret bird/pollinator friendly planting, sustainability concepts at the bioretention areas, and bird friendly coffee at the café kiosk.

PRECEDENT DIRECTIONAL SIGNS

EXPERIENCE MIGRATION LOGO





Photographs of physical model

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

RECEIVED
FEB 23 2017
QUINN EVANS ARCHITECTS

14 February 2017

Dear Mr. Kelly:

The staff of the Commission of Fine Arts has reviewed the final plans for the renovation of and additions to the Bird House and its associated landscape within the National Zoological Park. The staff has no objections to the final plans for this project.

With the authority delegated by the Commission at its meeting of 21 July 2016, we approve the final plans for the Bird House renovation project, as documented in the materials received and dated 2 February 2017. If there are any additional changes please contact the staff to determine if additional review will be required. As always, the staff is available to assist you with future submissions.

Sincerely,

Thomas E. Luebke, FAIA
Secretary

Dennis W. Kelly, Director
Smithsonian National Zoological Park
P.O. Box 37012, MRC 5508
Washington, DC 20013-7012

cc: Alyson Steele, Quinn Evans Architects
Ann Trowbridge, SI, Office of Planning & Project Management

GOVERNMENT OF THE DISTRICT OF COLUMBIA
STATE HISTORIC PRESERVATION OFFICE

DC STATE HISTORIC PRESERVATION OFFICE
FEDERAL AGENCY SECTION 106 REVIEW FORM

TO: Carly Bond, Smithsonian Institution and Matthew Flis, National Capital Planning Commission

ADDRESS: Via email to: BondC@si.edu and matthew.flis@ncpc.gov

PROJECT NAME/DESCRIPTION: Bird House Renovation Project

PROJECT ADDRESS/LOCATION DESCRIPTION: National Zoo

DC SHPO PROJECT NUMBER: 15-0224

The DC State Historic Preservation Office (DC SHPO) has reviewed the above-referenced federal undertaking(s) in accordance with Section 106 of the National Historic Preservation Act and has determined:

☐ This project will have **no effect** on historic properties. No further DC SHPO review or comment will be necessary.

☐ There are **no historic properties** that will be affected by this project. No further DC SHPO review or comment will be necessary.

☐ This project will have **no adverse effect** on historic properties. No further DC SHPO review or comment will be necessary.

☒ This project will have **no adverse effect** on historic properties **conditioned upon** fulfillment of the measures stipulated below.

In our letter dated July 29, 2016, we determined that this project would have "no adverse effect" on historic properties provided that certain conditions were met, including revising and consulting further on the finish of the new interior wall that will be used to frame the historic J.J. Early concrete door surround. Based upon further consultation with the Smithsonian, we understand and agree that the final finish will be "Brick Surround Option 1 (Hue Option 2)". Subsequently, we concurred that "Option 1" would be the most appropriate approach to address the previously unidentified need to provide additional building ventilation (i.e. expand the chimney). The attached images illustrate both of these approved options. Therefore, we concur that the proposed undertaking will have "no adverse effect" on historic provided the following two conditions are met: 1.) the Smithsonian will notify us of the results of the CFA and NCPC review of this project and 2.) the Smithsonian will consult further with our office if any options other than those referenced above are endorsed by CFA and/or NCPC, and/or if we determine that any other proposed revisions have the potential to constitute adverse effects.

BY: C. Andrew Lewis
Senior Historic Preservation Specialist
DC State Historic Preservation Office

DATE: January 27, 2017

1100 4th Street, S.W., Suite E650, Washington, D.C. 20024 Phone: 202-442-7600 Fax: 202-442-7638

BUILDING ADDITION:

1. Roof rafters:

- "...suggested eliminating the roof's projecting rafter extensions..." (CFA July 29, 2016)
  - *Design Team Response: The roof's projecting rafter extensions have been removed. (Dec. 08, 2016) Page 32.*

2. Alignment of wall and roof:

- "Shorten the extension of the ends of the bird feather front walls so ... therefore not aligned with roof...(Provide) details of this wall, end, exposed backside... (and) variation in panel colors and sizes." (CFA staff, Dec. 13, 2016)
  - *Design Team Response: New exterior renderings show the extents of the curved metal shingle walls pulled inward 16" at east and west. The cantilevered ends of the roof now extend beyond the walls, hovering. Additional construction and lighting integration details of the curved walls, including information about the variation in panel colors and sizes, have been included. (Jan 13, 2017)*

3. Metal panels:

- "...endorsed the idea of plumage as the inspiration for the cladding of the entrance pavilion, emphasizing the need for appropriate detailing and a subtle variety of colors and shapes..." (CFA July 29, 2016)
  - *Design Team Response: Further design development and detailing of the metal panels system has been advanced and provided for review and comment. (Dec. 08, 2016) Page 41-43.*

4. Skylight at entry lobby:

- "Indoor skylight above entry lobby: Suggests perhaps this could also be more expressive form....Make the support beam a tube or oval as discussed." (CFA staff, Dec. 13, 2016)
  - *Design Team Response: The curve of each ceiling edge and fascia below the skylight opening has been modified to express a single large sweep between the visitor arrival and the historic portal. The single gesture explicitly continues the curved vocabulary of the building exterior and interior, and hides the skylight edges from view. Additionally, detailing surrounding the portal surround has been refined to distinguish the ceiling geometry from the portal surround. The skylight structural ridge beam is now metal-wrapped tube steel, in pale grey, in accordance with the lobby and building addition ceilings. (Jan 13, 2017) Page 33-34.*

5. Historic portal surround:

- "...will frame the J.J. Early concrete door surround so that the wall is more evocative of the door surround's original setting (i.e. the historic exterior brick of the Bird House). The selected finish does not necessarily need to be brick, but whatever material or finish is ultimately selected should suggest the color and texture of the historic brick.." (SHPO, July 29, 2017)
  - *Design Team Response: The wall surround of the historic concrete portal is proposed to be a venetian plaster material in a color that is sympathetic to that of the historic masonry. (Dec. 08, 2016).*

- "...providing a suitable transition between the surround material and portal fabric, the materiality and perceived mass of the surround, suggesting a closer affinity with the historic masonry above." (SHPO, Dec. 13, 2016)
  - *Design Team Response: Three options for the design of the portal setting have been investigated to address the above. The preferred option illustrates the portal surround comprised of face brick with sympathetic (but identifiably new) hue, coursing, and detailing to the historic masonry. The transition between surround and portal is addressed by an arched soldier course. (Jan. 13, 2017)*

- "...agree that the final finish will be [the preferred option]." (SHPO Jan. 27, 2017) Page 33-34.

EXISTING BUILDING:

1. Chimney modifications:

- Recent Mechanical modeling has introduced the need for more high-elevation exhaust at the back-of-house areas south of the facility. At that location, a late-20th century brick chimney is inadequate to enclose all of the required flues. Modifications will require a total footprint roughly twice that of the existing chimney, as indicated by mechanical calculations and shown in the attached diagrams.
  - *Design Team Response: The design team anticipates developing detailing for a chimney with the following considerations:*
    - No visual impact upon the primary public facility entrance at north;
    - No impact to the historic decorative panel west of the existing chimney;
    - The top of the new chimney will align with the top of the existing one;
    - Modern brick of sympathetic hue, coursing, and detailing with respect to the historic masonry will be considered for masonry options. (Jan. 13, 2017)

  - *Four concept options have been considered to address the additional mechanical exhaust on the south elevation of the building:*
    - The preferred option adds a new brick masonry enclosure adjacent immediately south of the existing chimney. This additional chimney might be added to, or replace the existing chimney location. (Jan. 13, 2017)

- "...concur that [the preferred chimney option] would be the most appropriate." (SHPO, Jan. 27, 2017)

- "We have no objections to the preferred option." (CFA staff, Feb. 1, 2017) Page 44.

SITE DESIGN:

1. Plantings that frame the Clearing:

- "...suggested configuring the plantings that frame the oval in undulating drifts to soften its edges, and interspersing trees within the paved areas.." (CFA July 29, 2016)
    - *Design Team Response: The undulating drifts of the planting plan have been softened and interspersing trees have been added to the paved areas at the cafe and landing areas. This approach provides an eddy gathering area out of the main path of circulation. (Dec. 08, 2016)*

- "The incorporation of undulating drifts of perennial plantings is responsive to the commissioners' comments." *(CFA Dec. 13, 2016)*

2. Concave bench at the Landing:

- "..questioned the inward curve of the bench on the northern edge of the oval..." (CFA July 29, 2016)
    - *Design Team Response: After investigating the design approach of a completed oval, the design team felt strongly that the inward curve approach was an appropriate solution for the northern edge of the site. (Dec. 08, 2016)*

- The north bench concave curvature may be balanced through the use of paving material and color to complete the overall oval form of the main walkway. (CFA Dec. 13, 2016)
    - *Design Team Response: The bench and elliptical extension of Landing south into the Clearing provides an eddy gathering area out of the main path. Paving materials continue the line of the ellipse of the promenade to the north of the bench completing the shape of the ellipse. The eddy seating area paving is precast unit pavers. (Jan 13, 2017) Page 26.*

- "Perhaps, the curved bench should be recessed and follow the curve of the oval instead of the inward curve as shown in the proposal." (CFA Feb. 1, 2017)
    - *Response: Previous review and response from CFA Staff support the curved bench as presented in the proposal. (Feb. 2, 2017)*

3. Tree plantings to extend woodland setting:

- "Consider adding more trees in the vicinity of the entry from the bridge to form a small grouping." *(CFA Dec. 13, 2016)*
    - *Design Team Response: A primary function of the Landing, Promenade and Entry Plaza is to provide space for Zoo and FONZ-sponsored special events. This includes a requirement for open paving to install a variety of temporary tent sizes and functions. The attached site plan indicates dashed rectangles along the Promenade for vendor tents. Larger tents for seating are shown at the Entry Plaza and Café terrace. Additional trees have not been placed within the Promenade paving because of this essential program requirement.*

    The site design for the north entry is an interplay between the formal geometry of the Birdhouse entry axis and elliptical shape of the Promenade, and the informal, bird murmuration and successional inspired planting plan. A grouping of three redbud trees has been developed at the landing bench and entry to the Serpentine Path frame the important axial view of the Bird House. The trees are slightly offset and relate to a grouping of four redbud trees at the Café Terrace. (Jan 13, 2017) Page 27.

- "Were there any other configurations for the area on the north side of the oval studied that could be accommodate the additional trees?" (CFA Feb. 1, 2017)
    - *Design Team Response: A number of different design iterations were studied to accommodate the recommendation of "interspersing trees within the paves area" in order to "extend the woodland setting and provide shade for the visitor comfort". These studies are dated and have been provided for your review and reference. The placement of the trees within the paved areas was deemed infeasible by the NZP horticulture and maintenance department, stating concerns for the long term health of the trees and visitor experience. Please reference memo dated Jan 19, 2017 from Jennifer Daniels at the Smithsonian Institute NZP for further clarification on this comment. (Feb. 2, 2017) Page 27.*

4. Serpentine path:

- Consider use of a less formal, more uniform paving material at the serpentine pathway. (CFA Dec. 13, 2016)
    - *Design Team Response: The serpentine path is an important component of the Habitat trail that connects the Clearing to the entry plaza, Tracking Station deck and the westerly plant pollinator garden. The material of the serpentine path and habitat trail is crushed stone surfacing. At the serpentine path, its eastern edge along the lawn has been refined to be a flush concrete header that acts as a mow strip and assists in keeping loose stone out of the lawn. The area in front of benches is designed as precast pavers to withstand higher wear and tear that would occur from moving feet of visitors sitting on the bench that would otherwise create a divot if designed as crushed stone surfacing. (Jan 13, 2017) Page 26.*

Smithsonian
National Zoological Park
Conservation Biology Institute
Office of Planning and Strategic Initiatives

Memo

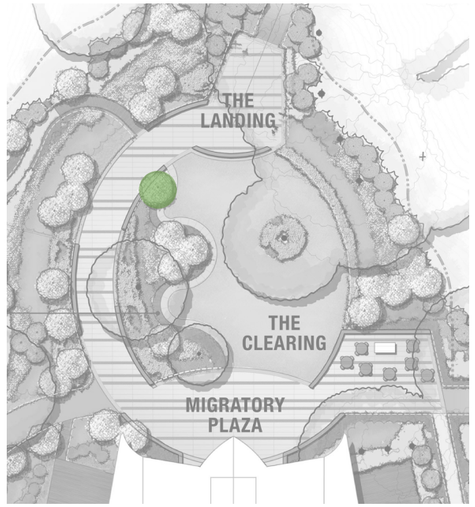
To: Nancy Levan, Design Manager, Smithsonian Facilities
From: Jennifer Daniels, Sr. Landscape Architect, PLA, ASLA, Office of Planning & Strategic Initiatives
cc: Teresa Vetick, Curator of Horticulture, Park Management
Date: January 19, 2017
Re: Experience Migration Site Design – Response to CFA Recommendation

In response to the Commission's recommendation to "interspersing trees within the paved area" in order to "extend the woodland setting and provide shade for the visitor comfort", the National Zoo provides the following justification for an alternative site design approach

Justification: After extensive discussions with our highly experienced Horticulture and Park Management team looking at site design from an operational perspective, we are proposing to shift the trees currently shown in the paved areas at the Arrival Plaza and Café into the adjacent planting beds. We base this proposal on existing precedents within the Zoo in three similar conditions where trees have been placed in hardscape with a poor long-term survival rate. Based on this experience, the placement of trees in hardscape is problematic due to our sites high performing operational requirements which includes clearance for handling snow removal, food service and event functionality and daily vehicular circulation for general maintenance and delivery throughout the plaza, café and walkway. We have observed over our collective experience trees in hardscape are hit and are consistently comprised by the weight of snow piles and snow treatment methods.

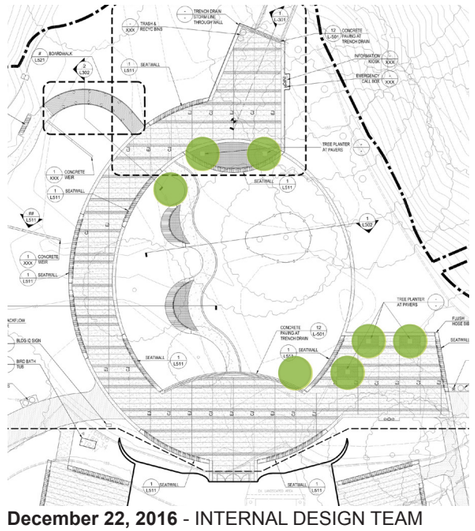
We feel that allowing for the trees to shift back into the softscape, the proposed site design is still able to address the Commission's suggestions by increasing the quantity of the Red Bud tree clusters at both the Plaza and Café, thereby increasing the diversity of seasonal color and size characteristic of a woodland landscape. We feel the design provides the necessary balance of both sun, in order to have a viable and robust understory, and shade, for the comfort of our visitors in these two aforementioned areas. By shifting the trees into the landscape and allowing for this proposed design, the National Zoo's project team will have the confidence they need to ensure long term horticultural success

February 2, 2017 - CFA - FINAL DESIGN SUBMISSION; refer to SI-NZP memo date January 19, 2017 (page 7) regarding response to CFA planting recommendation.

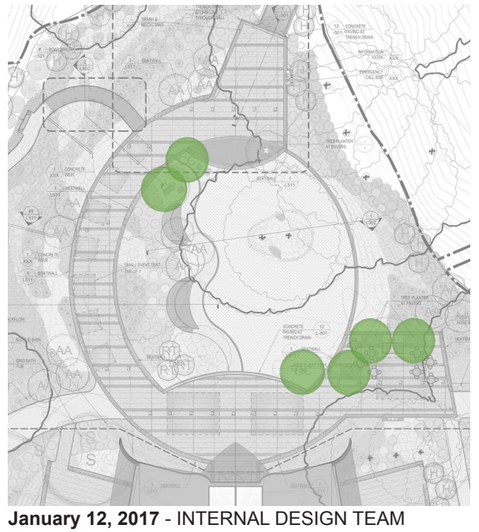


July 21, 2016 - CFA - REVISED CONCEPT DESIGN SUBMISSION; CFA recommends interspersing trees and extending the woodland setting.

December 8, 2016 - AGENCY STAFF PRESENTATION; CFA Staff recommends additional planting.



December 22, 2016 - INTERNAL DESIGN TEAM STUDY; SI-NZP maintenance and horticulture has concern with tree placement in paving at Landing area regarding tree health and visitor experience.



January 12, 2017 - INTERNAL DESIGN TEAM STUDY; SI-NZP maintenance and horticulture has concern with tree placement at Entry Plaza and Cafe regarding tree health and visitor experience.

Planting Plan Design Studies

Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
708	30	Japanese pagodatree	Styphnolobium japonicum	75	Good	34	35	1	45	1	Perimeter
709	20	Japanese pagodatree	Styphnolobium japonicum	69	Fair	24	33	1	30	1	Perimeter
710	10	mountainash, American	Sorbus americana	63	Fair	12	15	1	15	2	Perimeter
717	12	pine, eastern white	Pinus strobus	69	Fair	17	40	1	18	2	Perimeter
718	20	Japanese pagodatree	Styphnolobium japonicum	75	Good	27	50	1	30	1	Perimeter
1120	9	maple, red	Acer rubrum	69	Fair	16	25	1	14	1	ponds
1121	9, 6	elm, Siberian	Ulmus pumila	66	Fair	14	18	2	15	1	ponds, missin g tag
1130	12	maple, red	Acer rubrum	47	Poor	16	25	1	18	3	elephant, missing tag
1131	12	elm, Siberian	Ulmus pumila	50	Fair	15	16	1	18	2	Outside Pens
1132	30	oak, post	Quercus stellata	63	Fair	34	45	1	45	1	MISSING TAG, outside pens- beyond survey.
1133	23	Japanese pagodatree	Styphnolobium japonicum	75	Good	26	35	1	35	1	MISSING TAG, outside pens- beyond survey.
1294	6	pine, eastern white	Pinus strobus	50	Fair	18	35	1	9	2	
1295	7	pine, eastern white	Pinus strobus	50	Fair	10	12	1	11	2	
1296	15	pine, eastern white	Pinus strobus	56	Fair	9	25	1	23	2	flight cage
1299	9	pine, eastern white	Pinus strobus	50	Fair	18	35	1	14	2	FLIGHT CAGE
1300	12	pine, eastern white	Pinus strobus	50	Fair	10	12	1	18	2	FLIGHT CAGE
1301	8, 6, 5	birch, river	Betula nigra	50	Fair	14	15	1	0	2	FLIGHT CAGE
1302	11, 7	birch, river	Betula nigra	75	Good	20	25	2	18	1	flight cage
1308	6, 5	birch, river	Betula nigra	73	Good	18	30	2	11	1	flight cage
1309	6	birch, river	Betula nigra	75	Good	10	25	1	9	1	flight cage
1310	7, 3	birch, river	Betula nigra	75	Good	16	25	2	10	1	flight cage
1311	6, 5	birch, river	Betula nigra	70	Good	20	20	2	11	1	flight cage
1314	6, 4, 3	serviceberry, downy	Amelanchier arborea	55	Fair	12	12	3	13	1	flight cage
1315	7	maple, Japanese	Acer palmatum	44	Poor	20	14	1	11	3	flight cage
1317	18	maple, Norway	Acer platanoides	69	Fair	18	30	1	27	1	flight cage
1319	36	Japanese pagodatree	Styphnolobium japonicum	75	Good	28	30	1	54	1	flight cage

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Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1321	5, 4, 3, 2	yew, spp.	Taxus spp.	69	Fair	12	14	4	14	1	flight cage
1329	7	redcedar, eastern	Juniperus virginiana	75	Good	8	20	1	11	1	flight cage
1330	7	redcedar, eastern	Juniperus virginiana	75	Good	8	18	1	11	1	flight cage
1332	6	redcedar, eastern	Juniperus virginiana	75	Good	8	20	1	9	1	flight cage
1333	6	redcedar, eastern	Juniperus virginiana	41	Poor	2	8	1	9	3	flight cage, top gone
1336	8	redcedar, eastern	Juniperus virginiana	75	Good	6	20	1	12	1	flight cage
1337	7	redcedar, eastern	Juniperus virginiana	75	Good	8	20	1	11	1	flight cage
1340	11	ash, white	Fraxinus americana	75	Good	12	15	1	17	1	flight cage
1341	14	oak, willow	Quercus phellos	75	Good	15	30	1	21	1	flight cage, beyond survey.
1345	12	redcedar, eastern	Juniperus virginiana	47	Poor	10	20	2	18	3	flight cage, lean
1346	14	redcedar, eastern	Juniperus virginiana	56	Fair	10	18	1	21	1	flight cage
1349	9	magnolia, southern	Magnolia grandiflora	75	Good	10	20	1	14	1	flight cage
1350	7	Japanese pagodatree	Styphnolobium japonicum	75	Good	14	18	1	11	1	flight cage
1354	12	holly, American	Ilex opaca	72	Good	11	30	1	18	1	Bird house
1355	9	holly, Japanese	Ilex crenata	48	Poor	8	25	1	14	1	ponds
1356	22	Japanese pagodatree	Styphnolobium japonicum	67	Fair	28	45	1	33	3	ponds
1357	9	magnolia, southern	Magnolia grandiflora	75	Good	10	30	1	14	1	Bird house
1359	20	Japanese pagodatree	Styphnolobium japonicum	72	Good	42	50	1	30	1	Perimeter
1360	19	Japanese pagodatree	Styphnolobium japonicum	69	Fair	25	40	1	29	2	ENTRY DRIVE
1361	19	pine, Austrian	pinus sp	50	Fair	24	35	1	29	2	Flight cage
1366	16	ash, white	Fraxinus americana	63	Fair	20	18	1	24	2	Outside pens
1367	14	pine, eastern white	Pinus strobus	50	Fair	6	16	2	21	3	Outside pens
1368	4	pine, eastern white	Pinus strobus	50	Fair	2	12	1	6	2	FLIGHT CAGE
1371	14	pine, eastern white	Pinus strobus	50	Fair	14	24	1	0	2	FLIGHT CAGE
1377	11	pine, eastern white	Pinus strobus	50	Fair	12	22	1	0	2	FLIGHT CAGE
1380	9	pine, eastern white	Pinus strobus	50	Fair	11	22	1	14	2	FLIGHT CAGE
1385	41	oak, northern red	Quercus rubra	69	Fair	34	65	1	62	1	outside flight cage

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Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1387	6	maple, Norway	acer platenoides	31	Poor	8	12	2	9	3	FLIGHT CAGE
1388	5	tree	tree	50	Fair	6	12	1	8	3	Perimeter
1391	51	oak, northern red	Quercus rubra	69	Fair	3	55	1	77	60	Perimeter
1393	6	TREE	TREE	50	Fair	7	12	1	9	3	Perimeter
1394	23	beech, American	Fagus grandifolia	75	Good	28	55	1	35	1	Perimeter
1395	33	beech, American	Fagus grandifolia	75	Good	38	60	1	50	1	Perimeter
1410	26	mulberry, white	Morus alba	48	Poor	46	65	1	39	3	flight cage, hangers, beyond survey.
1411	14	maple, red	Acer rubrum	72	Good	20	60	1	21	1	flight cage- beyond survey.
1412	18	maple, sugar	Acer rubrum	19	I	22	55	1	27	3	flight cage- beyond survey.
1413	14	maple, red	Acer rubrum	66	Fair	46	65	1	21	1	flight cage, hangers- beyond survey.
1414	21	elm, American	Ulmus americana	48	Poor	24	35	2	32	1	flight cage- beyond survey.
1433	16	oak, white	Quercus alba	75	Good	35	44	1	24	1	elephant bridge
1443	22	oak, white	Quercus alba	72	Good	24	45	1	33	1	Elephant - beyond survey.
1446	10	Japanese pagodatree	Styphnolobium japonicum	72	Good	22	25	1	15	1	flight cage- beyond survey.
1447	6	Japanese pagodatree	Styphnolobium japonicum	69	Fair	16	30	1	9	1	flight cage- beyond survey.
1448	16	maple, red	Acer rubrum	69	Fair	25	40	1	24	1	flight cage- beyond survey.
1449	8	elm, American	Ulmus americana	48	Poor	14	25	1	12	2	flight cage- beyond survey.
1451	26	ash, green	Fraxinus pennsylvanica	50	Fair	32	55	1	39	2	flight cage- beyond survey.
1452	6	tuliptree	Liriodendron tulipifera	67	Fair	8	20	1	9	2	ponds- beyond survey.
1453	22	mulberry, white	Morus alba	47	Poor	32	35	1	33	2	ponds- beyond survey.
1457	8	pine, eastern white	Pinus strobus	47	Poor	7	25	1	12	2	flight cage- beyond survey.
1460	8	pine, eastern white	Pinus strobus	50	Fair	7	25	1	12	2	flight cage- beyond survey.
1461	22	tree of heaven	Ailanthus altissima	50	Fair	10	40	1	33	3	flight cage- beyond survey.
1462	10	pine, eastern white	Pinus strobus	63	Fair	10	40	1	15	2	flight cage- beyond survey.
1465	10	pine, eastern white	Pinus strobus	66	Fair	10	30	1	15	2	flight cage- beyond survey.
1467	14	pine, eastern white	Pinus strobus	72	Good	18	40	1	21	2	flight cage- beyond survey.
1470	11	pine, eastern white	Pinus strobus	69	Fair	10	35	1	17	2	flight cage, lean

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Tree Inventory

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Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1471	10	pine, eastern white	Pinus strobus	75	Good	6	35	1	15	2	flight cage, lean
1473	5	tree	tree	50	Fair	5	12	1	8	2	flight cage
1474	1	tree	tree	50	Fair	2	11	1	2	2	flight cage
1476	3	tree	tree	50	Fair	5	12	1	5	2	flight cage
1480	12	maple, red	Acer rubrum	48	Poor	18	30	1	18	1	flight cage
1484	16, 16	mulberry, white	Morus alba	52	Fair	44	45	2	32	2	ponds
1485	6	mulberry, white	Morus alba	48	Poor	14	20	1	9	1	ponds
1488	6	oak, white	Quercus alba	75	Good	7	18	1	9	1	ponds
1489	6	oak, white	Quercus alba	75	Good	8	20	1	9	1	ponds
1493	7	blackgum	Nyssa sylvatica	72	Good	6	18	1	11	1	ponds
1497	7, 7, 5	birch, river	Betula nigra	75	Good	22	30	3	19	1	ponds
1502	8	oak, swamp white	Quercus bicolor								ponds
1503	6	oak, swamp white	Quercus bicolor	75	Good	10	20	1	9	1	ponds
1506	14	pondcypress	Taxodium ascendens	75	Good	14	40	1	21	1	ponds
1507	10	holly, Japanese	Ilex crenata	50	Fair	10	30	1	15	1	ponds
1508	9	holly, Japanese	Ilex crenata	50	Fair	8	18	1	14	1	ponds, lean
1509	11	holly, Japanese	Ilex crenata	55	Fair	9	25	1	17	2	ponds- beyond survey.
1510	6, 2, 3	holly, Japanese	Ilex crenata	50	Fair	8	20	3	11	2	ponds
1512	7, 4	holly, Japanese	Ilex crenata	48	Poor	12	18	2	11	2	ponds- beyond survey.
1514	6	holly, Japanese	Ilex crenata	50	Fair	6	12	1	0	2	ponds
1515	13	cherry, black	Prunus serotina	52	Fair	14	30	1	20	2	ponds
1516	17	pondcypress	Taxodium ascendens	75	Good	16	45	1	26	1	ponds, lean
1517	10, 9, 7, 5	birch, river	Betula nigra	75	Good	38	30	4	31	1	ponds
1518	13, 7	birch, river	Betula nigra	75	Good	40	30	4	20	1	ponds
1520	5, 5, 5, 2	birch, river	Betula nigra	75	Good	16	20	4	17	1	ponds
1521	7	blackgum	Nyssa sylvatica	75	Good	12	16	1	11	1	ponds
1524	7	pondcypress	Taxodium ascendens	75	Good	16	25	1	11	1	ponds
1526	8	maple, red	Acer rubrum	69	Fair	14	25	1	12	1	ponds

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Tree Inventory

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Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1527	17	pondcypress	Taxodium ascendens	69	Fair	28	45	1	26	1	ponds
1528	16	pondcypress	Taxodium ascendens	75	Good	26	50	1	24	1	ponds
1529	19	pondcypress	Taxodium ascendens	75	Good	32	50	1	29	1	ponds
1530	17	birch, river	Betula nigra	75	Good	25	40	1	26	1	ponds
1536	18	pondcypress	Taxodium ascendens	69	Fair	24	55	1	27	1	ponds
1537	17, 16	pondcypress	Taxodium ascendens	47	Poor	28	50	2	33	3	ponds
1540	5	pondcypress	Taxodium ascendens	50	Fair	11	16	1	8	1	ponds
1544	8, 6	elm, Siberian	Ulmus pumila	50	Fair	12	22	1	0	2	ponds
1546	15	birch, river	Ulmus pumila	75	Good	34	40	1	23	1	ponds
1547	17	birch, river	Betula nigra	75	Good	30	40	1	26	1	ponds
1548	13	birch, river	Betula nigra	75	Good	24	40	1	20	1	ponds
1549	15	birch, river	Betula nigra	75	Good	24	35	1	23	1	ponds
1552	11	mulberry, white	Morus alba	50	Fair	14	22	2	22	3	ponds
1556	12	pondcypress	Taxodium ascendens	75	Good	12	22	3	22	1	ponds
1558	12	pondcypress	Taxodium ascendens	75	Good	12	22	3	22	1	ponds
1559	13	pondcypress	Taxodium ascendens	75	Good	14	24	3	24	1	ponds
1562	14	walnut, black	Taxodium ascendens	63	Fair	16	22	1	21	2	Elephant
1565	6	tree	Taxodium ascendens	50	Fair	8	12	1	9	2	Elephant
1570	14	elm, Siberian	Juglans nigra	50	Fair	16	22	1	21	2	Elephant
1571	6	oak, northern red	Ulmus pumila	59	Fair	30	55	1	9	2	Elephant
1572	30	oak, northern red	Quercus rubra	59	Fair	30	55	1	45	2	Elephant
1573	6	holly, American	Ilex opaca	59	Fair	9	12	1	9	2	Elephant
1574	9	holly, American	Quercus nigra	59	Fair	9	12	1	14	2	Elephant
1575	54	oak, willow	Quercus nigra	72	Good	55	66	1	81	1	Elephant, path
1577	38	oak, willow	Styphnolobium japonicum	69	Fair	40	55	1	57	1	Elephant, path
1581	21	Japanese pagodatree	Acer saccharum	72	Good	25	40	1	32	1	ponds- beyond survey.
1582	26	maple, sugar	Ilex opaca	41	Poor	32	35	1	39	3	Elephant - beyond survey.
1585	3,6	holly, American	Ilex opaca	50	Fair	7	12	2	9	2	Elephant
1586	3,5	holly, American	Ilex opaca	50	Fair	7	12	2	8	2	Elephant

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Tree Inventory

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1587	6	holly, American	Ilex opaca	56	Fair	6	12	1	9	2	Elephant
1588	4,7	holly, American	Liriodendron tulipifera	75	Good	8	14	2	11	2	Elephant
1589	34	tuliptree	Quercus rubra	50	Fair	35	66	1	51	1	Elephant
1591	25	oak, northern red	Acer griseum	75	Good	28	44	1	38	1	Elephant
1592	23	maple, paperbark	Acer saccharum	50	Fair	26	33	1	35	2	Elephant
1594	26	maple, sugar	Pinus strobus	50	Fair	28	33	1	39	2	Elephant
1595	11	pine, eastern white	Pinus strobus	48	Poor	15	25	1	17	3	ponds, lean
1596	8	pine, eastern white	Lagerstroemia indica	45	Poor	6	12	1	12	3	ponds, lean
1597	4, 3, 3, 2, 2	crapemyrtle, common	Lagerstroemia indica	69	Fair	13	16	5	14	2	ponds- not in survey
1599	5, 4, 3, 3, 2, 2	crapemyrtle, common	Pinus strobus	69	Fair	10	16	6	19	2	ponds- not in survey
1601	12	pine, eastern white	Pinus strobus	50	Fair	13	30	1	18	2	ponds, lean
1603	6	pine, eastern white	Pinus strobus	75	Good	8	12	1	9	2	Elephant
1604	29	tuliptree	Liriodendron tulipifera	63	Fair	30	44	1	44	1	Elephant
1605	29	maple, sugar	Acer saccharum	63	Fair	34	44	1	44	2	Elephant
1606	8	holly, American	Ilex opaca	75	Good	10	12	1	12	2	Elephant
1607	27	oak, northern red	Quercus rubra	50	Fair	26	22	1	41	2	Elephant
1608	12	oak, chestnut	Quercus prinus	50	Fair	12	12	1	18	1	Elephant
1609	28	oak, northern red	Quercus rubra	56	Fair	24	33	1	42	1	Elephant
1611	30	tuliptree	Liriodendron tulipifera	44	Poor	26	44	1	45	3	Elephant, lightning strike
1612	18	maple, sugar	Acer saccharum	50	Fair	16	22	1	27	2	Elephant
1613	10	tree of heaven	Ailanthus altissima	50	Fair	8	12	1	15	3	Elephant
1616	23	ash, white	Fraxinus americana	63	Fair	26	33	1	35	1	Elephant
1617	23	maple, Norway	Acer platanoides	44	Poor	26	44	1	35	3	Elephant
1618	40	tuliptree	Liriodendron tulipifera	72	Good	33	60	1	60	1	elephant
1620	23	maple, Norway	Acer platanoides	50	Fair	25	33	1	35	3	Elephant
1621	31	tuliptree	Liriodendron tulipifera	50	Fair	22	45	1	47	1	elephant
1622	14	maple, red	Acer rubrum	53	Fair	18	35	1	21	1	elephant

DAVEY RESOURCE GROUP
A Division of The Davey Tree Expert Company

N.T.S.

Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1625	33	tuliptree	Liriodendron tulipifera	72	Good	32	60	1	50	1	elephant
1627	16	maple, red	Acer rubrum	56	Fair	14	25	1	24	1	elephant
1652	19	pine, eastern white	Pinus strobus	50	Fair	24	30	1	29	1	Perimeter, top gone
1671	29	oak, chestnut	Quercus prinus	44	Poor	30	0	1	44	2	Perimeter of Kori Pens- beyond survey.
1672	19	cherry, black	Prunus serotina	38	Poor	20	0	1	29	2	Perimeter of Kori Pens
1721	13	tulippoplar	Liriodendron tulipifera	63	Fair	15	0	1	20	1	Outside pens- beyond survey.
1736	7	tree	tree	50	Fair	10	15	1	11	2	outside pens
1738	7, 5, 3	magnolia, spp.	Magnolia spp.	53	Fair	10	16	3	15	2	Outside pens
1739	6, 3	magnolia, spp.	Magnolia spp.	56	Fair	8	16	2	9	1	Outside pens
1739	6, 5, 3	magnolia, spp.	Magnolia spp.	50	Fair	12	14	3	14	1	Outside pens
1741	36	oak, northern red	Quercus rubra	59	Fair	38	55	1	54	1	Outside Pens
1742	16	maple, red	Acer rubrum	75	Good	18	33	1	24	1	Outside Pens
1743	14, 12	magnolia, spp.	Magnolia spp.	69	Fair	14	18	2	26	1	Outside pens
1744	7,7,7,7	photinia, spp.	Photinia spp.	59	Fair	13	14	4	28	3	Outside Pens
1746	9	cedar, eastern red	Juniperous	75	Good	9	13	1	14	2	Outside Pens
1747	33	oak, black	Quercus velutina	50	Fair	36	44	1	50	1	Outside Pens
1748	35	oak, northern red	Quercus rubra	75	Good	36	55	1	53	1	Outside Pens
1749	6,10	photinia, spp.	Photinia spp.	63	Fair	12	13	2	16	3	Outside Pens
1750	23	Japanese pagodatree	Styphnolobium japonicum	73	Good	24	45	1	35	1	Outside pens
1758	16	pine, Austrian	Pinus nigra	45	Poor	16	16	1	24	2	Outside Pens
1759	18	magnolia, southern	Magnolia grandiflora	72	Good	20	60	1	27	1	Bird house
1760	9	magnolia, southern	Magnolia grandiflora	75	Good	12	25	1	14	1	Bird house
1767	9	holly, American	Ilex opaca	69	Fair	8	25	1	14	2	Bird house
1768	5, 3	holly, American	Ilex opaca	50	Fair	8	25	2	8	2	Bird house
1769	6	holly, American	Ilex opaca	50	Fair	8	25	1	9	2	Bird house
1770	20	Japanese pagodatree	Styphnolobium japonicum	75	Good	30	35	1	30	1	Bird house
1774	13	magnolia, southern	Magnolia grandiflora	69	Fair	15	20	5	20	2	Bird house

DAVEY RESOURCE GROUP
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N.T.S.

Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
1775	8	magnolia, southern	Magnolia grandiflora	72	Good	8	16	1	12	1	Bird house
1776	5	crapemyrtle, common	Lagerstroemia indica	50	Fair	18	33	1	8	1	Bird house- beyond survey.
1778	15	magnolia, southern	Magnolia grandiflora	56	Fair	12	25	1	23	2	Bird house, foundation
1779	18	magnolia, southern	Magnolia grandiflora	50	Fair	38	0	1	27	2	Bird house, foundation
1782	17	magnolia, southern	Magnolia grandiflora	56	Fair	12	25	1	26	2	Bird house, foundation
1787	6, 4	holly, American	Ilex opaca	50	Fair	38	0	1	10	2	Bird house
1786	7	holly, American	Ilex opaca	56	Fair	12	25	1	11	2	Bird house
1788	36	oak, scarlet	Quercus coccinea	72	Good	36	65	1	54	1	Perimeter
1788	37	crapemyrtle, common	Lagerstroemia indica	72	Good	9	20	7	56	2	Bird house
1790	20	Japanese pagodatree	Styphnolobium japonicum	72	Good	29	60	1	30	1	Bird house
1794	27	maple, sugar	Acer saccharum	70	Good	28	65	1	41	2	Bird house
1796	53	princess tree	Ailanthus altissima	47	Poor	21	55	1	80	3	Bird house
1798	13	holly, American	Ilex opaca	75	Good	9	25	1	20	1	Bird house
1803	21	Japanese pagodatree	Styphnolobium japonicum	75	Good	28	60	1	32	1	Bird house
1806	28	oak, pin	Quercus paulustris	56	Fair	30	34	1	42	1	Outside Pens
1812	18	beech, American	Fagus grandifolia	63	Fair	20	24	1	27	1	Outside Pens
1813	19	beech, American	Fagus grandifolia	63	Fair	20	24	1	29	1	Outside Pens
1818	7	maple, Japanese	Acer palmatum	50	Fair	8	14	1	11	2	Outside Pens
1820	6	maple, Japanese	Acer palmatum	50	Fair	8	12	1	9	2	Outside Pens- beyond survey.
1825	7	maple, sugar	Acer saccharum	75	Good	9	12	1	11	2	Outside Pens
1835	15	hickory, pignut	Carya sp.	50	Fair	15	22	1	23	2	Kori pen left rear corner, verify tag
1836	32	oak, black	Quercus velutina	63	Fair	30	44	1	48	1	Outside pens
1837	30	oak, black	Quercus velutina	75	Good	35	44	1	45	1	Kori, left corner.
1839	23	Japanese pagodatree	Styphnolobium japonicum	75	Good	24	33	1	35	2	Kori pen front right corner, verify tag
3097	20	magnolia, southern	Magnolia grandiflora	56	Fair	36	35	1	30	2	elephant- beyond survey.

DAVEY RESOURCE GROUP
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N.T.S.

Date: April 2014

Tree Inventory

Project: NPZ Bird House

Tree Tag #	DBH (Diameter at 4.5 feet above grade)	Common Name	Scientific Name	Condition Rating %	Condition Rating	Approx Canopy Radius (FT)	Approx Tree Height (FT)	Number of Stems	CRZ Critical Root Zone Radius in Ft (1.5 ft radius/in DBH)	Priority (1-4)	AREA DESCRITPION
5001	6	elm, Siberian	Ulmus pumila	50	Fair	8	12	1	9	2	pond edge
5002	18, 15	magnolia, southern	Magnolia grandiflora	58	Fair	22	30	2	33	1	bird house, foundation, missing tag

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N.T.S.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 18. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC- 3, #9202
1315 East- West Highway
Silver Spring, MD 20910- 3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map files were obtained from DCGIS OCTO. These files were compiled at a scale of 1:1000 based on 2002 aerial photography produced by USGS. Additional information may have been derived from other sources. Users of this FIRM should be aware that minor adjustments may have been made to specific features.

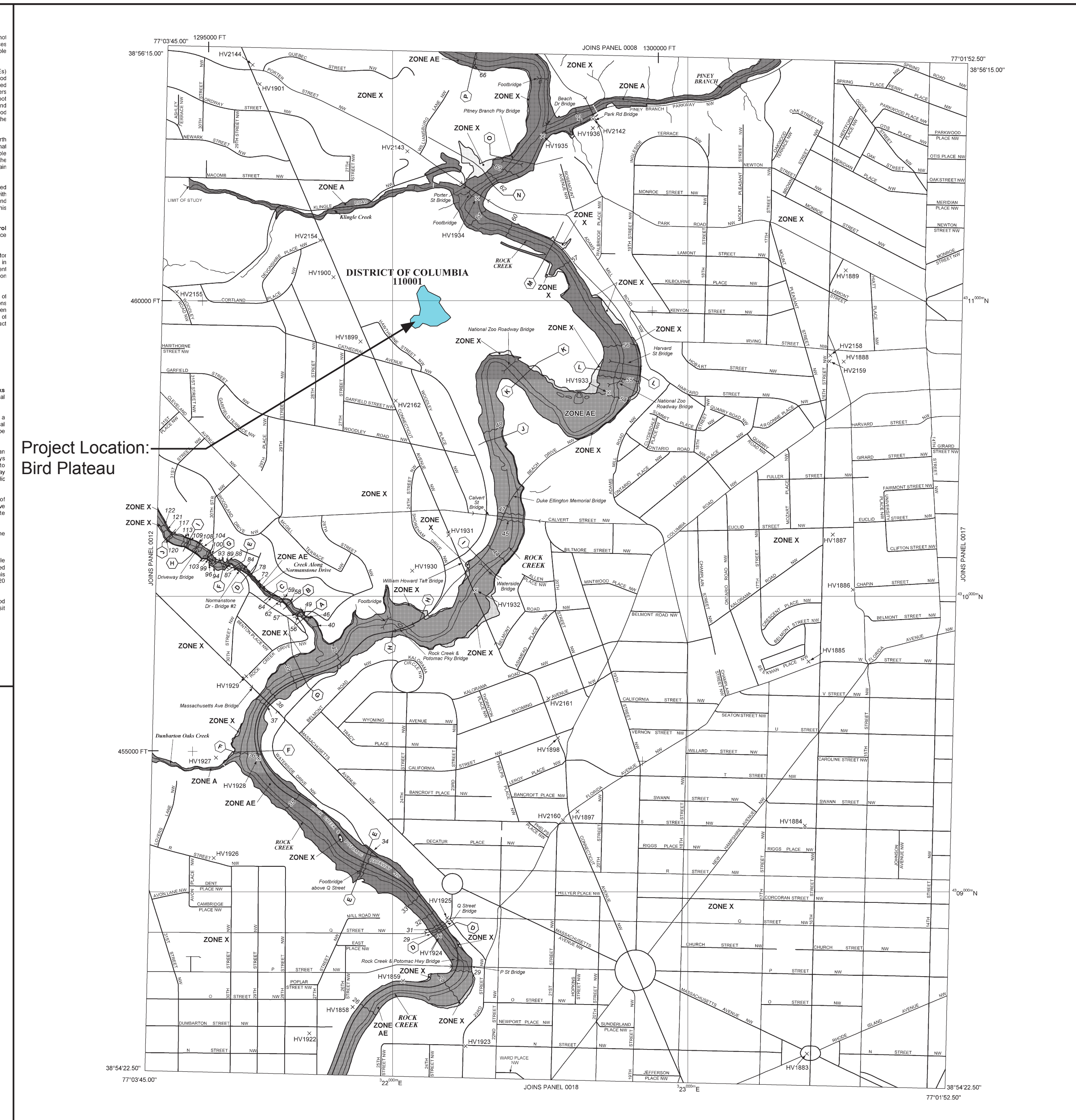
This map reflects more detailed and up- to- date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map showing the layout of map panels for this jurisdiction.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and /or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}75^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 18
600000 FT	5000-foot grid ticks: Maryland State Plane coordinate system, (FIPSZONE 1900), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Department of Environment, 51 N St, NE, Suite 5020, Washington, DC 20002
(Maps available for reference only, not for distribution)

INITIAL NFIP MAP DATE
November 1, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS
October 10, 1975

FLOOD INSURANCE RATE MAP EFFECTIVE
November 15, 1985

FLOOD INSURANCE RATE MAP REVISIONS
September 27, 2010 - to incorporate previously issued Letters of Map Amendment, to change Base Flood Elevations, to reflect updated topographic information, to add roads and road names, to change Special Flood Hazard Areas, to add Special Flood Hazard Areas, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1,000 FEET

150 0 150 300 METERS

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0016C

FIRM
FLOOD INSURANCE RATE MAP

DISTRICT OF COLUMBIA, WASHINGTON, D.C.

PANEL 16 OF 100
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DISTRICT OF COLUMBIA	110001	0016	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 1100010016C

MAP REVISED SEPTEMBER 27, 2010

Federal Emergency Management Agency

N.T.S.

Flood Insurance Rate Map (FIRM) - Panel 1100010016C