HOESSLE HERPETARIUM SOLARIUM EXHIBIT VIEWING GLAZING REPLACEMENT AND EXHIBIT PARTITION GLAZING INSTALLATION

PART 1 – GENERAL

1.1 GENERAL SCOPE OF WORK

A. The construction site is located at the Komodo Dragon Exhibit at the Charles H. Hoessle Herpetarium Solarium Building and work consists of the following:

   a Demolition of the existing six panels of exhibit viewing glass (Approximate dimension of existing panels from top of existing frame to bottom of existing frame = 136″ x 52″).

   b Installation of six new panels of exhibit viewing glass.

   c Installation of new exhibit partition glass (Approximate dimension of partition glass = 78″ x 120″).

B. Delegated design: The design of the glazing is to be completed by a qualified professional engineer who is licensed in the State of Missouri.

   a Design criteria to include animal loading.

C. Visit site to assess conditions. Project and site conditions are unusual and as a result field measurements are to be thorough and extensive and to be obtained prior to submitting bids.

D. Prepare opening for installation of the new frame.

E. Provide fully designed, code compliant, dark bronze anodized aluminum frame and laminated safety glass system, replacing the existing six panels.

F. Submit 12 x 12 laminated glass samples and shop drawings for approval prior to proceeding with the work.

G. Install panels into the new frame with butt joints sealed with structural silicone sealant.

H. Clean glass, remove all debris. Participate in a project completion inspection with the owner.

1.2 LABELS

A. Temporary labels:

   1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.

2. Label in accordance with National Fenestration Rating Council label requirements.
3. Temporary labels are to remain intact until glass is approved by Owner's project manager.

B. Permanent labels:

1. Locate in corner for each pane.
2. Label in accordance with ANSI Z97.1 and SGCC label requirements.
   a. Tempered glass.
   b. Laminated glass or have certificate for panes without permanent label.
   c. Organic coated glass.

1.3 PERFORMANCE REQUIREMENTS

A. General: Design glazing system consistent with guidance and practices presented in the GANA Glazing Manual, GANA Laminated Glazing Manual, and GANA Sealant Manual, as applicable to project. Installed glazing is to withstand applied loads, thermal stresses, thermal movements, building movements, , and combinations of these conditions without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; unsafe engagement of the framing system; deflections beyond specified limits; or other defects in construction.

B. Glazing Unit Design: Design glass, including engineering analysis meeting requirements of authorities having jurisdiction. Design to be delegated to and completed by a qualified professional engineer who is licensed in the State of Missouri. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

1. Design glass in accordance with ASTM E1300 by a properly substantiated structural analysis.
2. Loading criteria to include animal loading.
3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection utilizing design wind pressure to not more than the structural capacity of the glazing unit, the threshold at which frame engagement is no longer safely assured, 1/100 times the short-side length, or 19 mm (0.75 inch), whichever is less.

4. Tolerances:

   a. Outside dimensions: Overall outside dimensions (height and width) of laminated security glazing are to maintain tolerance of 3 mm (± 0.12 inch).

   b. Warpage: Out-of-flat (warpage or bowing) condition of laminates is not to exceed 2.5 mm per lineal meter (0.10 inch per 3.3 lineal foot). The condition, if present, is to be localized to an extent not greater than 0.75 mm (0.03 inch) for any 0.3 meter (0.98 feet) section.

1.4 SUBMITTALS

A. Construction Submittals to include:

1. Product Data:

   i Each kind of glass required.

   ii Elastic compound for metal sash glazing.

   iii Glazing cushion.

   iv Sealing compound

2. Warranty and

3. Samples.

4. Shop Drawings.

5. Samples:

   a. Size: 305 mm by 305 mm (12 inches by 12 inches).

B. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery: Schedule delivery to coincide with glazing installation schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.

B. Storage: Store crates according to printed instructions on crates, in areas least subject to traffic or falling objects. Keep the storage area clean and dry.

C. Handling: Unpack crates following printed instructions on crate. Stack individual glass units on edge leaned slightly against upright supports with separators between each.

D. Protect laminated glazing units against face and edge damage during entire sequence of fabrication, handling, and delivery to installation location. Provide protective covering on exposed faces of glazing, and mark inside as "INTERIOR FACE" or "PROTECTED FACE":

1. Treat glazing as fragile merchandise. Glazing to be packaged and shipped in wood crates with width end in upright position and blocked together in a mass. Storage and handling to comply with manufacturer's directions and as required to prevent edge damage or other damage to glazing resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, other environmental conditions, and contact with chemical solvents.

2. Temporary protections: The front and back of glazing are to be temporarily protected with compatible, peelable, heat-resistant film which will be peeled back for inspections and re-applied and finally removed after glass is installed at destination.

3. Edge protection: To cushion and protect glass, the four (4) edges are to be sealed the depth of glazing with continuous standard-thickness thermoplastic rubber tape. Alternatively, continuous channel shaped extrusion of thermoplastic rubber is to be used, with flanges extending into face sides of glazing.

1.6 PROJECT CONDITIONS

A. Field Measurements:

1. Project and project site conditions are unusual and as a result, field measurements are to be thorough and extensive.

2. Field measure openings before ordering tempered glass products to assure for proper fit of field measured products.

1.7 WARRANTY

A. Construction Warranty: Comply with the FAR clause 52.246-21 “Warranty of Construction”.

B. Manufacturer’s Warranty: Manufacturer shall warranty their glazing from the date of installation and final acceptance by the Owner as follows.

1. Laminated glass units to remain laminated for five (5) years.

1.8 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by acronym only.

B. American Architectural Manufacturers Association (AAMA):

800.....Test Methods for Sealants

810.1-77.....Expanded Cellular Glazing Tape

C. American National Standards Institute (ANSI):

Z97.1-14.....Safety Glazing Material Used in Building - Safety Performance

D. ASTM International (ASTM):

C542-05(2017).....Lock-Strip Gaskets C716-06(2020).....Installing Lock-Strip Gaskets and Infill Glazing Materials

C794-18.....Adhesion-in-Peel of Elastomeric Joint Sealants

C864-05(2019).....Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

C920-18.....Elastomeric Joint Sealants

C964-20.....Standard Guide for Lock-Strip Gasket Glazing

C1036-16.....Flat Glass

C1048-18.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

C1172-19.....Laminated Architectural Flat Glass

C1349-17.....Standard Specification for Architectural Flat Glass Clad Polycarbonate

E119-20.....Standard Test Methods for Fire Test of Building Construction and Material

E1300-16.....Load Resistance of Glass in Buildings

E1886-19.....Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

E1996-17.....Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

E. Code of Federal Regulations (CFR):

16 CFR 1201-10.....Safety Standard for Architectural Glazing Materials

F. Consumer Product Safety Commission

Safey Glass, Category II (CPSC Cfr 1201)

G. Glass Association of North America (GANA):

2022 Edition.....GANA Glazing Manual

2008 Edition.....GANA Sealant Manual

2009 Edition.....GANA Laminated Glazing Reference Manual

2010 Edition.....GANA Protective Glazing Reference Manual

H. International Code Council (ICC):

IBC.....International Building Code

I. National Fire Protection Association (NFPA):

J. National Fenestration Rating Council (NFRC)

K. Safety Glazing Certification Council (SGCC) 2012:

Certified Products Directory (Issued Semi-Annually).

L. Underwriters Laboratories, Inc. (UL):

9-08(R2009).....Fire Tests of Window Assemblies

263-14.....Fire Tests of Building Construction and Materials

752-11.....Bullet-Resisting Equipment.

L. Environmental Protection Agency (EPA):

40 CFR 59(2014).....National Volatile Organic Compound Emission Standards for Consumer and Commercial Products

PART 2 - PRODUCT

2.1 GLASS

A. Provide laminated safety glass with clear PVB interlayer designed for the existing opening coordinated with new perimeter frame system.

1. Glass panels to have a minimum thickness of:
2. Provide minimum 6 mm (1/4 inch) thick glass layers and as additionally required to meet performance requirements.

B. Obtain glass units from single source from single manufacturer for each glass type.

C. Ultra-Clear-Low-Iron Float Glass:

1. ASTM C1036, Type I, Class 1, Quality q3 and with visible light transmission of not less than 90 percent.

2.2 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Two or more lites of heat-treated glass bonded with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent-resin interlayer complying with interlayer manufacturer's written instructions.

B. Interlayer: Use 1.5 mm (0.060 inch) thick interlayer for:

1. Assemblies requiring heat strengthened or fully tempered glass.

C. Interlayer: Use 2.28 mm (0.090 inch) thick interlayer where required to meet performance requirements.

D. Interlayer Color: Clear.

2.3 GLAZING ACCESSORIES

A. Provide accessories as needed to provide a complete installation. Ferrous metal accessories exposed in the finished work are to have a finish that will not corrode or stain while in service.

B. Setting Blocks: ASTM C864:

1. Silicone type.
2. Channel shape: having 6 mm (1/4 inch) internal depth.
3. Shore A hardness of 80 to 90 Durometer.
4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.

C. Spacers: ASTM C864:

1. Channel shape having a 6 mm (1/4 inch) internal depth.
2. Flanges not less than 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
3. Lengths: 25 to 76 mm (1 to 3 inches).
4. Shore A hardness of 40 to 50 Durometer.

D. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.

E. Glazing Sealants: ASTM C920, silicone neutral cure:

1. Type S.
2. Class 25 or 50 as recommended by manufacturer for application.
3. Grade NS.
4. Shore A hardness of 25 to 30 Durometer.

F. Structural Sealant: ASTM C920, silicone acetoxy cure:

5. Type S.
6. Class 25.
7. Grade NS.
8. Shore a hardness of 25 to 30 Durometer.

G. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.

9. Channel shape: flanges may terminate above the glazing channel or flush with the top of the channel.
10. Designed for dry glazing.

H. Color:

1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames to match color of the finished aluminum and be nonstaining.
2. The color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted are to be black, gray, or neutral color.

PART 3 – EXECUTION

3.1 DEMOLITION OF THE EXISTING EXHIBIT VIEWING GLASS

A. Review of Site Conditions and Demolition and Removal Description:

1. Review for conditions which may adversely affect viewing glazing unit demolition/removal, prior to commencement of demolition/ removal. Do not proceed with removal/demolition work until unsatisfactory conditions have been corrected.

3.2 EXAMINATION

A. Verification of Conditions:

1. Verify the following openings:

   i Exhibit viewing glass opening.

   ii Exhibit partition glass opening.

2. Examine openings that are receiving glass and glazing units; determine if the opening are the proper size; plumb; square; and level before installation is started.

3. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.

B. Review for conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. Verify that wash down of adjacent masonry, adjacent wall and ceilings is completed prior to erection of glass and glazing units.

3.2 PREPARATION

A. For sealant glazing, prepare glazing surfaces in accordance with GANA Sealant Manual.

B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.

C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.

D. Verify that components used are compatible.

E. Clean and dry glazing surfaces.

F. Prime surfaces are scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION - GENERAL

A. Installation occurs at the following two locations:

1. Exhibit Viewing Opening (between Public Viewing Area and Komodo Habitat 1 and Komodo Habitat 2.)

2. Exhibit Partition Opening. (Between Komodo Habitat 1 and Komodo Habitat 2.

B. Install in accordance with GANA Glazing Manual and GANA Sealant Manual, unless specified otherwise.

C. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.

D. Set glazing without bending, twisting, or forcing of units.

E. Do not allow glass to rest on or contact any framing member.

F. Tempered Glass: Install roller distortions in horizontal position unless otherwise directed.

G. Laminated Glass:

1. Tape edges to seal interlayer and protect from glazing sealants.

2. Do not use putty or glazing compounds.

3.4 REPLACEMENT AND CLEANING

A. Clean new glass surfaces by removing temporary labels, paint spots, and defacement after approval by Contracting Officer's Representative.

B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.

C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.5 PROTECTION

A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

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