SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnish all labor and materials necessary to complete all work of this Section in accordance with the General Requirements, General Conditions, Drawings and all other requirements of the Contract Documents.

1.2 SUMMARY

A. Provide structural steel as per drawings. Include related anchors, fasteners, and connectors.

1. New observation deck supports, grating and railing.
2. New Spiral Stair support braces.
3. Glass lantern structural supports for walls and roof.

B. Related Work:

1. Section 055000 Metal Fabrications
2. Section 099600 Painting

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer structural-steel connections required by the Contract Documents to be selected or completed by fabricator to withstand design loadings indicated.

1. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural-steel connections.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components, including connections, splices, holes, welds, and bolts.

1. Include Shop Drawings and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Mill test reports.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures & personnel as per AWS D1.1, "Structural Welding Code Steel."

B. Comply with applicable provisions of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

C. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category I, conventional steel structures.

D. Comply with applicable provisions in AISC's “Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" and RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Mockups: Prepare benchmark samples of each component to receive the blackened finish treatment indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standard for materials and execution.

F. Preinstallation Conference: Conduct conference at Project site.

1.6 STORAGE AND PROTECTION

A. Store steel members off ground and protect steel members and packaged materials from erosion and deterioration.

B. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: **ASTM A 572/A 572M, Grade 50**.

B. Channels, Angles: **ASTM A 36/A 36M, Grade 50**.

C. Plate and Bar: **ASTM A 36/A 36M, Grade 50**.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade **B**, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

1. Finish: **Hot-dip zinc coating, ASTM A 153/A 153M, Class C**.

B. Threaded Rods: **ASTM A 36/A 36M**.

1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."

2.8 BLACK PATINA SOLUTION SURFACE TREATMENT

A. Shop Applied Painting: Provide suitably prepared substrate as per manufacturer’s directions & recommendations for cleaning and finishing. Finish exposed exterior and concealed steel surfaces of steel components.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

    a. Electrochemical Products Inc; Insta-Blak SS-370.
    b. Sculpt Nouveau Patinas and Metal Finishes; Blackened Stainless Steel.

2.9 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and to prepare test reports. Comply with Part 3 "Field Quality Control" Article.

PART 3 - EXECUTION

3.1 ERECTION

A. Examination: Verify elevations of masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

    1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges".

C. Base and Bearing Plates: Clean masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.

    1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
    2. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
    3. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

D. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

    1. Joint Type: Snug tightened.

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