SECTION 03200 - CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete 2016.

B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).

C. ACI SP-66 - ACI Detailing Manual 2004.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2018.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.

F. CRSI (DA4) - Manual of Standard Practice 2009.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi (420 MPa)) for deformed bars.

B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.

1. Form: Flat Sheets.

2. WWR Style: As indicated on drawings.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Comply with applicable code for concrete cover over reinforcement.

END OF SECTION

SECTION 03300 - CAST-IN-PLACE-CONCRETE

PART 4 GENERAL

4.1 SUMMARY

A. Provide cast-in-place concrete, reinforcing and accessories.

4.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Mix Design: Submit for approval mix design proposed for use. Include designation as Normal Weight or Lightweight mixes in accord with reference standards.

4.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Testing: Employ an independent testing agency acceptable to Owner to design concrete mixes and to perform material evaluation tests. Provide 7- and 28-day cylinder tests. Comply with ASTM C 143, C 173, C 31 and C 39.

C. Standards:

1. ACI 301, Specifications for structural Concrete for Buildings.
2. ACI 318, Building Code Requirements for Reinforced Concrete, and CRSI Manual of Standard Practice.

D. Mock-Ups: Provide mock-up as required to demonstrate quality of workmanship.

E. Floor Flatness and Levelness Tolerances:

1. Subfloors Under Materials Such as Concrete Toppings, Ceramic Tile, and Sand Bed Terrazzo: ACI 302.1R and ASTM E 1155, floor flatness (Ff) of 15, floor levelness (Fl) of 13.
2. Subfloors Under Materials Such As Vinyl Tile, Epoxy Toppings, Paint, and Carpet: ACI 302.1R and ASTM E 1155, floor flatness (Ff) of 20, floor levelness (Fl) of 17.

PART 5 PRODUCTS

5.1 MATERIALS

A. Cast-In-Place Concrete:

1. Manufacturers, Concrete Color Additives: Davis Colors; Legacy Decorative Concrete Systems, Inc.; or approved equal.
2. Manufacturers, Concrete Forming and Accessories: Ceme-Tube LLC; Newark Paperboard Products; Scott System, Inc.; Symons; Universal Building Products, Inc.; or approved equal.
3. Manufacturers, Concrete Anchoring: Powers Fasteners.; or approved equal.

4. Manufacturers, Colored and Imprinted Concrete: Bomanite Corp.; Legacy Decorative Concrete Systems, Inc.; Symons; or approved equal.
5. Manufacturers, Integral Waterproofing of Concrete: Xypex Chemical Corp.; or approved equal.
6. Manufacturers, High Tolerance Floor Treatment: Dayton Superior Specialty Chemical.
7. Manufacturers, Concrete Finishes: Kemiko Concrete Stains; Legacy Decorative Concrete Systems, Inc.; Super Stone, Inc.; or approved equal.
8. Manufacturers, Concrete Curing, Sealing and Hardening: Armorlon, Division of Reef Industries, Inc.; Ashford Formula, By Curecrete.; or approved equal.
9. Manufacturers, Cement Grouts, Adhesives and Sealants: Five Star Products, Inc.; or approved equal.
10. Manufacturers, Concrete Resurfacing and Rehabilitation: MAPEI Corp.; ProSpec (formerly Bonsal branded products); or approved equal.
11. Application: Columns and beams.
12. Application: Foundations and footings.
13. Application: Slabs on grade.
14. Application: Concrete on metal deck.
15. Application: Exterior site concrete and pads.
16. Finish for Vertical Surfaces Exposed To View: Smooth rubbed finish.
17. Mechanically Applied Finish for Vertical Surfaces Exposed To View: Bushhammer finish.
18. Finish for Vertical Surfaces Not Exposed To View: As-cast form finish.
19. Finish for Horizontal Surfaces To Receive Concrete or Mortar Setting Bed: Scratch finish.
20. Finish for Surfaces to be Exposed to View or Covered with Resilient Flooring, Carpet Tile or Other Thin Finish System: Trowel finish.
21. Finish for Surfaces to Receive Thin-set Ceramic or Quarry Tile: Trowel and fine broom finish.
22. Finish for Exterior Concrete Platforms, Steps, Ramps and Sloped Walls: Non-slip broom finish.
23. Cast-In-Place Concrete Reinforcing and Accessories:
    a. Concrete Design Mixes: ASTM C 94, 28-day compressive strength suitable for project requirements and site conditions.
    b. Formwork: Plywood or metal panel formwork sufficient for structural and visual requirements.
    c. Reinforcing Bars: ASTM A 767, Class II, galvanized.
    d. Steel Wire: ASTM A 82.
    e. Steel Wire Fabric: ASTM A 497, welded, deformed.
    f. Concrete Materials: ASTM C 150, Type I, Portland cement; potable water.
    g. Concrete Admixtures: Containing less than 0.1 percent chloride ions.
    h. Reglets: Galvanized sheet steel reglets, minimum 26 gauge (.018 inch).
    i. Waterstops: Rubber, PVC or self expanding butyl/bentonite waterstops.
    j. Vapor Retarder: ASTM D 4397 polyethylene sheet, 10 mils.
    k. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class A.
    l. Underlayment Compound: Free-flowing, self-leveling cement-based compound.
    m. Bonding Compound: Polyvinyl acetate or acrylic base.
    n. Epoxy Adhesive: ASTM C 881, two-component material.
24. Reference Standards: ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
25. Reference Standards: ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete 1998 (Reapproved 2004).

PART 6 EXECUTION

6.1 INSTALLATION

A. Comply with ASTM C 94. Do not change mix design without approval. Calcium chloride admixtures are not permitted.

B. Chamfer exposed edges/corners to provide straight lines.

C. Tolerance: Plus 1/8 inch in 10 inches for grade, alignment, and straightness.

D. Construction Joints: Use keyways, continue reinforcement through joint.

E. Expansion Joints: For exterior work locate 30 feet o.c. at approved locations. Provide smooth dowels across joint which permit 1 inch horizontal movement and no vertical shear movement.

F. Isolation Joints: Provide between slabs and vertical elements such as columns and structural walls.

G. Control Joints: Provide sawn or tooled joints or removable insert strips; depth equal to 1/4 slab thickness. Spacing as required and approved.

H. Wall Finishes: As-cast and patched for concealed work; rubbed smooth, filled and cement paste coated for exposed work.

I. Slab Finishes: Obtain sample approval before beginning work.

1. Scratch: For surfaces to receive mortar setting beds or cementitious flooring materials.
2. Trowel: Hard, smooth, uniform surface for areas to receive resilient flooring, carpet, or other thin finish material.
3. Broom: After trowel finishing, roughen surface by fine brooming perpendicular to traffic direction for exposed exterior walks, steps and ramps.
4. Non-Slip Aggregate: After trowel finishing, uniformly trowel 25-lbs./100 square feet of damp non-slip aggregate into surface. Cure, then rub lightly to expose aggregate. Use for interior exposed concrete stairs and ramps.
5. Exposed Aggregate: Use chemical retarder or tamp aggregate into wet concrete and expose by brushing with water. Use where indicated.
6. Hardener Finish: For exposed interior concrete floors. Follow manufacturer's directions.

J. Cure and protect work. Report defective work in writing.

END OF SECTION

SECTION 05121 - STRUCTURAL STEEL FRAMING

PART 7 GENERAL

7.1 SUMMARY

A. Provide structural steel assemblies and accessories.

7.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

C. Submit for approval test reports.

7.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Standards: AISC, Code of Standard Practice for Steel Buildings and Bridges, and applicable regulations.

C. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, and installation tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

D. Testing: Independent testing laboratory.

E. Erection Tolerances: AISC standards.

PART 8 PRODUCTS

8.1 MATERIALS

A. Structural Steel:

1. Application: Building structure.
2. Application: Architecturally exposed structural steel.
3. Application: Remodeling of existing structural steel systems.
4. Structural Steel Shapes, Plates, and Bars: ASTM A 572.
5. Cold-Formed Steel Tubing: ASTM A 500, Grade B.
6. Hot-Formed Steel Tubing: ASTM A 501.
7. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.
8. Steel Castings: ASTM A 27, Grade 65-35.
9. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020.
10. Anchor Bolts: ASTM A 307, nonheaded type.
11. Unfinished Threaded Fasteners: ASTM A 307, Grade A.
12. High-Strength Threaded Fasteners: ASTM A 325 or ASTM A 490, as applicable.
13. Auxiliary Materials:

a. Direct Tension Indicators: ASTM A 959.
b. Electrodes for Welding: AWS Code.

14. Structural Steel Primer Paint: SSPC - Paint 13, compatible with topcoats.
15. Cement Grout: Portland cement, sand.
16. Metallic Shrinkage-Resistant Grout: Premixed ferrous aggregate grouting compound ASTM C 1107.
17. Nonmetallic Shrinkage-Resistant Grout: Premixed nonmetallic grouting compound, ASTM C 1107.

PART 9 EXECUTION

9.1 INSTALLATION

A. Comply with AISC codes and specifications, and with AWS "Structural Welding Code."

B. Employ a registered engineer to check elevations and plumb and level tolerances; certify that installed work is within AISC Standards. Owner may engage testing/inspection agency to inspect welded and bolted connections.

C. Architecturally exposed steel: Fabricate with special care using materials carefully selected for best appearance. Store materials off ground and keep clean. Cut, fit and assemble work with surfaces smooth, square and with complete contact at joints. Set all cambers up. Weld all work continuously; grind smooth and flush to make seams not visible after priming. Prepare surfaces to comply with SSPC-SP6; apply prime coat within 24 hours after cleaning.

D. Touch up field welds and abraded areas with shop primer.

END OF SECTION

SECTION 05210 - STEEL JOIST

PART 10 GENERAL

10.1 SUMMARY

A. Provide steel joists.

10.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

10.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Standards: Steel Joist Institute (SJI) Standard Specifications.

PART 11 PRODUCTS

11.1 MATERIALS

A. Steel Joists:

1. Manufacturers: Hambro Structural Systems, Div. Canam Steel Corp.; or approved equal as accepted by the Steel Joist Institute and as approved by Design Engineer.
2. Application: Floor support.
3. Application: Roof support.
4. Steel: SJI specifications for chord and web sections.
5. Steel Bearing Plates: ASTM A 36.
6. Type: K-series open web steel joists.
7. Type: KCS-series open web steel joists.
8. Type: LH-series long span steel joists.
9. Type: DLH-series deep longspan steel joists.
10. Type: Joist girders.
11. Auxiliary Materials:
    a. Unfinished Threaded Fasteners: ASTM A 307, Grade A.
    b. Steel Prime Paint: SJI specifications.

PART 12 EXECUTION

12.1 INSTALLATION

A. Fabricate and install joists in compliance with SJI requirements and recommendations. Shop primer shall be compatible with finish paint specified in painting section.

B. Coordinate installation of anchor bolts with other work as necessary. Place joists and bridging

simultaneously; align work and weld or bolt into place in accordance with SJI specifications. Grout as required for sound bearing.

C. Touch up damaged coatings using same primer as shop painting. All repair and touch up measures must be as stated in a written plan for review and approval by the Architect and Engineer.

END OF SECTION

SECTION 05310 - STEEL DECK

PART 13 GENERAL

13.1 SUMMARY

A. Provide steel deck.

13.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.

13.3 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

B. Standards: AISI, Specification for the Design of Cold-Formed Steel Structural Members; and SDI Design Manual for Composite Decks, Form Decks, and Roof Decks.

C. Approvals: UL label and FM listing.

PART 14 PRODUCTS

14.1 MATERIALS

A. Steel Deck:

1. Manufacturers: Cordeck; United Steel Deck, Inc.; or approved equal.
2. Application: Steel roof deck.
3. Application: Acoustical steel roof deck.
4. Application: Long-span steel roof deck.
5. Application: Long-span cellular steel roof deck.
6. Application: Composite steel floor deck.
7. Application: Composite cellular metal floor deck with electrical distribution.
8. Application: Noncomposite cellular metal floor deck with electrical distribution.
9. Application: Noncomposite steel form deck.
10. Application: Noncomposite vented steel form deck.
11. Steel Type: Steel for painted metal deck, ASTM A 611, Grade C.
12. Steel Type: Steel for galvanized metal deck, ASTM A 653, G 90 coating.
13. Steel Type: Aluminum-zinc alloy-coated steel sheet, ASTM A 792, Grade 33, AZ 50.
14. Steel Shapes: ASTM A 36.
15. Shear Connectors: Headed stud type, ASTM A 108.
16. Sheet Metal Accessories: ASTM A 653, G 60, commercial quality, galvanized.
17. Galvanizing: ASTM A 653, G60.
18. Galvanizing Repair: ASTM A 780.
19. Paint: Rust-inhibitive paint.
20. Auxiliary Materials:
    a. Metal cover plates.

b. Metal closure strips.
c. Roof sump pans.
d. Flexible closure strips.
e. Acoustic sound barrier closures.

PART 15 EXECUTION

15.1 INSTALLATION

A. Form to span at least 3 supports and with 2-inch laps. Place deck flat, square and with cells aligned. Anchor deck securely in place following manufacturer's directions and approved shop drawings.

B. Cut and fit neatly around penetrations; provide additional framing, reinforcement and closure pieces to maintain structural continuity. Anchor closure strips at ends, edges, and penetrations.

C. Touch up damaged coatings with primer or galvanized repair paint.

END OF SECTION