

# Project Manual

Bulk Steel Package  
Not for Construction



COLLEGE OF  
Osteopathic Medicine  
AT THE CHEROKEE NATION

Tahlequah, Oklahoma

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March 15, 2019





# TABLE OF CONTENTS

## LEGEND

First Column:	Current Date for Section
Second Column:	Checked Indicates Section is Included in Current Issue
Third Column:	Section Number
Fourth Column:	Section Title
Fifth Column:	Section Author

## ISSUES

<b>Bid Package 01, Demolition</b>	<b>2019-01-18</b>	
<b>Addendum No. 01</b>	<b>2019-02-08</b>	
<b>Bulk Steel Package</b>	<b>2019-03-15</b>	<b>Not for Construction</b>

### NOTE FOR REVISED SPECIFICATION SECTIONS

1. DELETED INFORMATION IS INDICATED BY A STRIKETHROUGH (IE, ~~THIS IS DELETED~~).
2. NEW INFORMATION IS INDICATED BY A DOUBLE UNDERLINE (IE, THIS IS ADDED).
3. ALL REVISED INFORMATION IS FURTHER IDENTIFIED BY A HEAVY VERTICAL LINE TO THE RIGHT OF ALL REVISIONS IN EACH INDIVIDUAL SPECIFICATION SECTION (REFER TO HEAVY BOLD LINE TO THE RIGHT FOR AN EXAMPLE).

## VOLUME 1

### DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

	<input type="checkbox"/>	00 1115	Invitation to Bid
	<input type="checkbox"/>	00 2113	Instructions to Bidders
2019-02-08	<input type="checkbox"/>	00 3100	Available Project Information
	<input type="checkbox"/>	00 4100	Bid Form
	<input type="checkbox"/>	00 5200	Agreement Form
	<input type="checkbox"/>	00 6100	Bonds
2019-02-08	<input type="checkbox"/>	00 7200	General Conditions
	<input type="checkbox"/>	00 7300	Supplementary Conditions

### DIVISION 01 - GENERAL REQUIREMENTS

	<input type="checkbox"/>	01 0500	Design Selections
	<input type="checkbox"/>	01 0510	Exterior Design Selections
	<input type="checkbox"/>	01 0520	Interior Design Selections
	<input type="checkbox"/>	01 1000	Summary
	<input type="checkbox"/>	01 2100	Allowances
2019-02-08	<input type="checkbox"/>	01 2200	Unit Prices

**17-13 OSU, College of Osteopathic Medicine at  
Cherokee Nation  
Childers Architect  
2019-03-15**

**TABLE OF CONTENTS**

2019-02-08	<input type="checkbox"/>	01 2300	Alternates
2019-02-08	<input type="checkbox"/>	01 2500	Substitution Procedures
2019-02-08	<input type="checkbox"/>	01 2600	Contract Modification Procedures
2019-02-08	<input type="checkbox"/>	01 2900	Payment Procedures
2019-02-08	<input type="checkbox"/>	01 3100	Project Management and Coordination
2019-02-08	<input type="checkbox"/>	01 3200	Construction Progress Documentation
	<input type="checkbox"/>	01 3233	Photographic Documentation
	<input type="checkbox"/>	01 3300	Submittal Procedures
	<input type="checkbox"/>	01 4000	Quality Requirements
	<input type="checkbox"/>	01 4200	References
2019-02-08	<input type="checkbox"/>	01 4323	Special Inspection
2019-02-08	<input type="checkbox"/>	01 4339	Visual Mock-Up Requirements
2019-02-08	<input type="checkbox"/>	01 4516	Field Test for Water Leakage
	<input type="checkbox"/>	01 4540	Testing Mock-Up for Building Enclosure Systems
2019-02-08	<input type="checkbox"/>	01 5000	Temporary Facilities and Controls
2019-02-08	<input type="checkbox"/>	01 6000	Product Requirements
2019-02-08	<input type="checkbox"/>	01 7300	Execution
2019-02-08	<input type="checkbox"/>	01 7419	Construction Waste Management and Disposal
	<input type="checkbox"/>	01 7420	LEED Construction Waste Management and Disposal
2019-02-08	<input type="checkbox"/>	01 7700	Closeout Procedures
2019-02-08	<input type="checkbox"/>	01 7823	Operations and Maintenance Data
2019-02-08	<input type="checkbox"/>	01 7839	Project Record Documents
2019-02-08	<input type="checkbox"/>	01 7900	Demonstration and Training
	<input type="checkbox"/>	01 7910	Demonstration and Training
2019-02-08	<input type="checkbox"/>	01 8111	Sustainable Construction Requirements
	<input type="checkbox"/>	01 8112	LEED Construction Requirements
	<input type="checkbox"/>	01 8113	LEED Construction Requirements for New Construction and Major Renovations
	<input type="checkbox"/>	01 8123	LEED Construction Requirements for Commercial Interiors
	<input type="checkbox"/>	01 8133	LEED Construction Requirements for Core and Shell Development
	<input type="checkbox"/>	01 8143	LEED Construction Requirements for Schools
2019-02-08	<input type="checkbox"/>	01 9113	General Commissioning Requirements

## DIVISION 02 - EXISTING CONDITIONS

2019-01-18	<input type="checkbox"/>	02 1113	Selective Site Demolition
		02 1116	Building Demolition
	<input type="checkbox"/>	02 4119	Selective Demolition

## DIVISION 03 - CONCRETE

<input type="checkbox"/>	03 0150	Concrete Patching
<input type="checkbox"/>	03 1100	Concrete Forming
<input type="checkbox"/>	03 1500	Concrete Accessories
<input type="checkbox"/>	03 2000	Concrete Reinforcing
<input type="checkbox"/>	03 3000	Cast-In-Place Concrete
<input type="checkbox"/>	03 3500	Concrete Finishing
<input type="checkbox"/>	03 3543	Polished Concrete
<input type="checkbox"/>	03 3600	Special Concrete Finishes

<input type="checkbox"/>	03 3800	Post-Tensioned Concrete
<input type="checkbox"/>	03 4100	Plant-Precast Structural Concrete
<input type="checkbox"/>	03 4500	Architectural Precast Concrete
<input type="checkbox"/>	03 4713	Tilt-Up Concrete
<input type="checkbox"/>	03 4900	Glass-Fiber Reinforced Precast Concrete (GFRC)
<input type="checkbox"/>	03 5216	Lightweight Insulating Concrete
<input type="checkbox"/>	03 5300	Concrete Toppings
<input type="checkbox"/>	03 5416	Hydraulic Cement Underlayment

**DIVISION 04 - MASONRY**

<input type="checkbox"/>	04 2100	Masonry Veneer
<input type="checkbox"/>	04 2200	Concrete Unit Masonry
<input type="checkbox"/>	04 2300	Glass Unit Masonry
<input type="checkbox"/>	04 4200	Exterior Stone Cladding
<input type="checkbox"/>	04 4216	Steel Supported Stone Cladding
<input type="checkbox"/>	04 7200	Cast Stone Masonry
<input type="checkbox"/>	04 7500	Adhered Masonry Veneer

**DIVISION 05 – METALS**

2019-03-15	<input checked="" type="checkbox"/>	05 1000	Structural Steel
	<input type="checkbox"/>	05 1200	Structural Steel Framing
2019-03-15	<input checked="" type="checkbox"/>	05 1213	Architecturally Exposed Structural Steel (AESS) Framing
	<input type="checkbox"/>	05 1636	Barrier Cables
	<input type="checkbox"/>	05 2100	Steel Joists Framing
2019-03-15	<input checked="" type="checkbox"/>	053000	Metal Decking
	<input type="checkbox"/>	05 3100	Steel Decking
	<input type="checkbox"/>	05 3123	Steel Roof Deck System
	<input type="checkbox"/>	05 3133	Permanent Metal Forming
	<input type="checkbox"/>	05 4000	Cold-Formed Steel Framing
	<input type="checkbox"/>	05 4300	Slotted Channel Framing
2019-03-15	<input checked="" type="checkbox"/>	05 5000	Metal Fabrications
2019-03-15	<input checked="" type="checkbox"/>	05 5100	Metal Stairs
	<input type="checkbox"/>	05 5213	Pipe and Tube Railings
	<input type="checkbox"/>	05 5300	Metal Gratings
	<input type="checkbox"/>	05 5813	Ornamental Metal Column Covers
2019-03-15	<input checked="" type="checkbox"/>	05 6000	Metal Equipment Support System
	<input type="checkbox"/>	05 7000	Ornamental Metal
	<input type="checkbox"/>	05 7300	Ornamental Handrails and Railings

**DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES**

<input type="checkbox"/>	06 1053	Miscellaneous Rough Carpentry
<input type="checkbox"/>	06 1643	Exterior Gypsum Sheathing
<input type="checkbox"/>	06 4023	Interior Architectural Woodwork
<input type="checkbox"/>	06 4223	Slatwall Paneling
<input type="checkbox"/>	06 6100	Simulated Stone Fabrications
<input type="checkbox"/>	06 6400	Plastic (FRP) Paneling

- 06 6413 Translucent Resin Panel Fabrications
- 06 6419 Simulated Stone Paneling
- 06 6713 Louvered Light Diffusers
- 06 6813 Plastic Gratings

**DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

- 07 0151 Preparation for Re-Roofing
- 07 0152 Patching of Existing Roofing
- 07 1114 Asphalt Mastic Dampproofing
- 07 1328 Pre-Applied Sheet Waterproofing
- 07 1352 Modified Bituminous Sheet Waterproofing
- 07 1413 Hot Fluid-Applied Rubberized Asphalt Waterproofing
- 07 1416 Cold Fluid Applied Waterproofing
- 07 1616 Crystalline Waterproofing
- 07 1700 Bentonite Waterproofing
- 07 1800 Traffic Coatings
- 07 1900 Water Repellents
- 07 2100 Thermal Insulation
- 07 2119 Spray-Applied Foam Insulation
- 07 2400 EIFS
- 07 2423 DEFS for Soffits
- 07 2500 Mechanically Fastened Air and Water Barriers
- 07 2613 Rubberized Asphalt Vapor Retarders
- 07 2617 Below Slab Vapor Retarders
- 07 2713 Self-Adhering Air and Water Barriers
- 07 3113 Asphalt Shingles
- 07 3127 Simulated Slate Roofing
- 07 3200 Roof Tiles
- 07 4114 Metal Roof Panels
- 07 4213 Formed Metal Wall Panels
- 07 4229 Terra Cotta Wall Panels
- 07 4243 Composite Metal Wall Panels
- 07 4263 Insulated-Core Metal Wall Panels
- 07 5013 Single-Ply Membrane Roofing
- 07 5216 Modified Bituminous Membrane Roofing
- 07 5556 Fluid-Applied Protected Membrane Roofing
- 07 5563 Vegetated Protected Membrane Roofing
- 07 6200 Flashing and Sheet Metal
- 07 7200 Roof Accessories
- 07 7600 Roof Pavers and Pedestal Assemblies
- 07 8116 Cementitious Fireproofing
- 07 8123 Intumescent Mastic Fireproofing
- 07 8413 Penetration Firestopping
- 07 8446 Fire-Resistive Joint Firestopping
- 07 9100 Preformed Joint Seals
- 07 9200 Joint Sealants
- 07 9500 Expansion Control

## DIVISION 08 - OPENINGS

<input type="checkbox"/>	08 0610	Door Schedule
<input type="checkbox"/>	08 1113	Hollow Metal Doors and Frames
<input type="checkbox"/>	08 1114	Interior Hollow Metal Frames
<input type="checkbox"/>	08 1170	Steel Fire Door and Frame Assembly
<input type="checkbox"/>	08 1216	Interior Aluminum Frames
<input type="checkbox"/>	08 1416	Prefinished Flush Wood Doors
<input type="checkbox"/>	08 1433	Stile and Rail Wood Doors
<input type="checkbox"/>	08 3113	Access Doors and Frames
<input type="checkbox"/>	08 3213	Sliding Aluminum-Framed Glass Doors
<input type="checkbox"/>	08 3313	Coiling Counter Doors
<input type="checkbox"/>	08 3323	Overhead Coiling Doors
<input type="checkbox"/>	08 3326	Overhead Coiling Grilles
<input type="checkbox"/>	08 3338	Interior Side Coiling Grilles
<input type="checkbox"/>	08 3470	Acoustical Metal Door, Window, and Frame Assemblies
<input type="checkbox"/>	08 3513	Folding Doors
<input type="checkbox"/>	08 3515	Accordion Folding Fire Doors
<input type="checkbox"/>	08 3613	Sectional Overhead Doors
<input type="checkbox"/>	08 4110	Interior Storefront
<input type="checkbox"/>	08 4127	Exterior All-Glass Entrances and Storefronts
<input type="checkbox"/>	08 4128	Interior All-Glass Entrances and Storefronts
<input type="checkbox"/>	08 4213	Exterior Aluminum Entrance Doors
<input type="checkbox"/>	08 4216	Interior Aluminum Entrance Doors
<input type="checkbox"/>	08 4229	Automatic Entrances
<input type="checkbox"/>	08 4233	Revolving Entrance Doors
<input type="checkbox"/>	08 4243	Medical Specialty Sliding Entrances
<input type="checkbox"/>	08 4400	Glazed Aluminum Framing Systems
<input type="checkbox"/>	08 4426	Structural Glass Curtainwall
<input type="checkbox"/>	08 4500	Translucent Insulating Panel Assemblies
<input type="checkbox"/>	08 5113	Aluminum Windows
<input type="checkbox"/>	08 5619	Sliding Pass Windows
<input type="checkbox"/>	08 5656	Bullet-Resistive Windows
<input type="checkbox"/>	08 6200	Unit Skylights
<input type="checkbox"/>	08 6300	Metal-Framed Skylights
<input type="checkbox"/>	08 7100	Door Hardware
<input type="checkbox"/>	08 7121	Interior Automatic Door Operators for Staff Use
<input type="checkbox"/>	08 7122	Automatic Door Operators for the Disabled
<input type="checkbox"/>	08 8000	Glazing
<input type="checkbox"/>	08 8300	Unframed Mirrored Glazing
<input type="checkbox"/>	08 8816	Between Glass Blinds Units
<input type="checkbox"/>	08 8840	Switchable Privacy Glass Units
<input type="checkbox"/>	08 9100	Wall Louvers

## DIVISION 09 - FINISHES

<input type="checkbox"/>	09 0565	Floor Preparation for Renovation Work
<input type="checkbox"/>	09 0600	Room Finish Schedule
<input type="checkbox"/>	09 2300	Gypsum Plastering
<input type="checkbox"/>	09 2400	Portland Cement Plastering

<input type="checkbox"/>	09 2600	Veneer Plastering
<input type="checkbox"/>	09 2613	Gypsum Veneer Plastering
<input type="checkbox"/>	09 2713	GFRG Fabrications
<input type="checkbox"/>	09 2900	Gypsum Board Assemblies
<input type="checkbox"/>	09 3000	Tiling
<input type="checkbox"/>	09 5113	Acoustical Panel Ceilings
<input type="checkbox"/>	09 5133	Acoustical Metal Pan Ceilings
<input type="checkbox"/>	09 5135	Snap-in Metal Pan Ceilings
<input type="checkbox"/>	09 5423	Linear Metal Ceilings
<input type="checkbox"/>	09 5436	Suspended Decorative Grids
<input type="checkbox"/>	09 6115	Concrete Floor Sealer
<input type="checkbox"/>	09 6116	Liquid Floor Hardener
<input type="checkbox"/>	09 6119	Moisture Floor Treatment
<input type="checkbox"/>	09 6340	Stone Flooring
<input type="checkbox"/>	09 6400	Wood Flooring
<input type="checkbox"/>	09 6500	Resilient Flooring
<input type="checkbox"/>	09 6513	Resilient Base and Accessories
<input type="checkbox"/>	09 6520	Interlocking Rubber Tile Flooring
<input type="checkbox"/>	09 6603	Precast Terrazzo Flooring for Stairs
<input type="checkbox"/>	09 6613	Thick-Set Terrazzo Flooring
<input type="checkbox"/>	09 6623	Thin-Set Terrazzo Flooring
<input type="checkbox"/>	09 6723	Resinous Flooring
<input type="checkbox"/>	09 6800	Carpeting
<input type="checkbox"/>	09 6900	Access Flooring
<input type="checkbox"/>	09 7200	Wall Covering
<input type="checkbox"/>	09 7213	Tackboard Wall Coverings
<input type="checkbox"/>	09 7500	Interior Stone Facing
<input type="checkbox"/>	09 7723	Fabric Wrapped Panels
<input type="checkbox"/>	09 8433	Acoustical Wall Panels
<input type="checkbox"/>	09 9100	Painting
<input type="checkbox"/>	09 9413	Textured Interior Coatings
<input type="checkbox"/>	09 9600	High-Performance Coatings
<input type="checkbox"/>	09 9613	Multicolored Interior Coatings
<input type="checkbox"/>	09 9653	Elastomeric Coatings
<input type="checkbox"/>	09 9663	Textured Acrylic Coating

**DIVISION 10 - SPECIALTIES**

<input type="checkbox"/>	10 1100	Visual Display Boards
<input type="checkbox"/>	10 1146	Visual Display Fabrics
<input type="checkbox"/>	10 1400	Interior Signage
<input type="checkbox"/>	10 1443	Photoluminescent Exit Path Marking System
<input type="checkbox"/>	10 1700	Telephone Specialties
<input type="checkbox"/>	10 2113	Toilet Compartments
<input type="checkbox"/>	10 2115	Cubicle Specialties
<input type="checkbox"/>	10 2213	Wire Mesh Partitions
<input type="checkbox"/>	10 2223	Accordion Folding Partitions
<input type="checkbox"/>	10 2238	Operable Panel Partition
<input type="checkbox"/>	10 2239	Vertically Folding Panel Partitions
<input type="checkbox"/>	10 2613	Wall and Corner Guards
<input type="checkbox"/>	10 2813	Toilet Accessories



<input type="checkbox"/>	10 2819	Shower Doors and Enclosures
<input type="checkbox"/>	10 4116	Emergency Key Cabinets
<input type="checkbox"/>	10 4400	Fire Protection Specialties
<input type="checkbox"/>	10 4450	Automated External Defibrillators (AED)
<input type="checkbox"/>	10 5113	Metal Lockers
<input type="checkbox"/>	10 5116	Wood Lockers
<input type="checkbox"/>	10 5503	USPS-Delivery Postal Specialties
<input type="checkbox"/>	10 5506	Private-Delivery Postal Specialties
<input type="checkbox"/>	10 5713	Wall Mounted Coat Rack and Shelf
<input type="checkbox"/>	10 7113	Exterior Sun Control Devices
<input type="checkbox"/>	10 7500	Flagpoles

**DIVISION 11 - EQUIPMENT**

<input type="checkbox"/>	11 1300	Loading Dock Equipment
<input type="checkbox"/>	11 2400	Building Maintenance Equipment
<input type="checkbox"/>	11 5213	Projection Screens
<input type="checkbox"/>	11 7000	Medical Equipment
<input type="checkbox"/>	11 7313	Wall-Mounted Fold-Up Writing Surface
<input type="checkbox"/>	11 7316	Wall-Mounted Chart Rack

**DIVISION 12 - FURNISHINGS**

<input type="checkbox"/>	12 2113	Horizontal Louver Blinds
<input type="checkbox"/>	12 2116	Vertical Louver Blinds
<input type="checkbox"/>	12 2413	Roller Window Shades
<input type="checkbox"/>	12 2500	Between Glass Blinds
<input type="checkbox"/>	12 3553	Laboratory Casework
<input type="checkbox"/>	12 3571	Stainless Steel Casework
<input type="checkbox"/>	12 3640	Stone Countertops
<input type="checkbox"/>	12 3661	Simulated Stone Countertops
<input type="checkbox"/>	12 4816	Entrance Floor Grilles
<input type="checkbox"/>	12 4843	Entrance Floor Mats
<input type="checkbox"/>	12 6300	Stadium Seating
<input type="checkbox"/>	12 9313	Bicycle Racks

**DIVISION 13 - SPECIAL CONSTRUCTION**

<input type="checkbox"/>	13 2817	Ballpark Netting and Supports	
<input type="checkbox"/>	13 3448	Pre-Fabricated Rooftop Helipad	
<input type="checkbox"/>	13 4900	Radiation Protection	
<input type="checkbox"/>	13 4923	RF/MRI Modular Shielding Enclosure	
2019-03-15	<input checked="" type="checkbox"/>	13 8500	Seismic Protection

**DIVISION 14 - CONVEYING EQUIPMENT**

<input type="checkbox"/>	14 1000	Dumbwaiters
<input type="checkbox"/>	14 2100	Electric Traction Elevators
<input type="checkbox"/>	14 2400	Hydraulic Elevators
<input type="checkbox"/>	14 3100	Escalators

- 14 9100 Chutes
- 14 9200 Pneumatic Tube Systems

**DIVISION 31 - EARTHWORK**

- 2019-01-18  31 1000 Site Clearing
- 31 2000 Earth Moving
- 31 2300 Building Excavation
- 31 2400 Earthwork for Structures
- 2019-01-18  31 2500 Erosion and Sedimentation Controls
- 31 3116 Termite Control
- 31 6213 Prestressed Concrete Piles
- 31 6216 Steel H Piles
- 31 6218 Mini-Piles
- 31 6329 Drilled Concrete Piers

**DIVISION 32 - EXTERIOR IMPROVEMENTS**

- 32 1313 Concrete Paving
- 32 1413 Interlocking Precast Concrete Paving
- 32 1416 Brick unit Paving
- 32 1440 Stone Paving
- 32 1715 Parking Accessories
- 32 3113 Chain Link Fencing
- 32 3115 Tubular Steel Fencing
- 32 3117 Gate Operators
- 32 3121 Cable Guardrail System

**DIVISION 33 - UTILITIES**

- 2019-01-18  33 1000 Water Utilities
- 33 4613 Foundation Drainage System

END OF TABLE OF CONTENTS

**SECTION 05 1000**  
**STRUCTURAL STEEL**

**PART 1 - GENERAL**

**1.1 WORK INCLUDED**

- A. This section includes the fabrication and erection of structural steel.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Architecturally Exposed Structural Steel Framing – Section 05 1213
- B. Steel Joists - Section 05 2100
- C. Metal Deck - Section 05 3000
- D. Painting and Coating – Section 09 90 00

**1.3 QUALITY ASSURANCE**

- A. Qualifications of Fabricator: Fabricator shall have a minimum of 5 years experience in the fabrication of structural steel of structures of similar size. Fabricator shall have AISC or IAS certification or other certification as approved by the building official and the engineer of record. If the fabricator does not have approved certification, special inspection shall be done on the fabrication process and on the fabricated material as required by Section 1704.2, Inspection of Fabricators of the International Building Code. The non-certified fabricator shall engage a special inspector that meets the requirements of IBC section 1704.1 and is acceptable to the building official and the engineer of record. Provide documentation verifying certification or provide special inspector information for approval prior to issuance of a building permit.
- B. Qualifications of Erector: Erector shall have a minimum of 5 years experience in the erection of structural steel of structures of similar size.
- C. Qualifications of Field Welders: Welders shall be certified in accordance with AWS D1.1 within the last 12 months.
- D. Reference Standards:
  - 1. ASTM International (ASTM), latest versions.
    - a. ASTM A 36/  
A36M                      Standard Specification for Carbon Structural Steel
    - b. ASTM A 53/  
A 53M                      Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless
    - c. ASTM A 61/  
A6M                        Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
    - d. ASTM A 307              Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

- e. ASTM A 325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
  - f. ASTM A 490 Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
  - g. ASTM A 500/A500M Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
  - h. ASTM A 992/A 992M Standard Specification for Structural Steel Shapes
  - i. ASTM C 1107/C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (non-shrink)
  - j. ASTM F1554 Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
2. American Welding Society (AWS), latest edition.
    - a. AWS D1.1 Structural Welding Code-Steel
  3. American Institute of Steel Construction (AISC), Steel Construction Manual, latest edition.
    - a. Specification for Structural Steel Buildings
    - b. AISC Code of Standard Practice
    - c. Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

#### **1.4 SUBMITTALS**

- A. Shop Drawings: Submit shop drawings including erection plans, complete details and schedules for fabrication and assembly of structural steel members. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols, and show size, length, and type of each weld. Shop drawings shall not be made by reproduction of the Contract Drawings.
- B. Provide setting drawings and directions for installation of anchor bolts and other anchorages to be installed by others.
- C. Welder Certification: Submit affidavit stating that all welders are certified in accordance with AWS and provide copies of welder's certificates.

#### **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Support structural steel above ground on skids, pallets, platforms, or other supports.
- B. Protect steel from damage.
- C. Store packaged materials in original unbroken package or container.

- D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures.
- E. Replace damaged shapes or members.
- F. Waste Management and Disposal; As specified in Division 01 Section "Construction Waste Management" and as follows: Collect cut offs and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. All Wide Flange Shapes shall conform to ASTM A 992, Grade 50 unless noted otherwise.
- B. All Angles, Channels, Plates, and Bars: ASTM A 36.
- C. Structural Steel Pipe: ASTM A 53, Type E or S, Grade B  $F_y=35$  ksi
- D. Rectangular or Square Hollow Structural Section: ASTM A 500, Grade B,  $F_y = 46$  ksi.
- E. Round Hollow Structural Sections: ASTM A 500, Grade B,  $F_y=42$  ksi.
- F. Anchor Bolts: ASTM F1554, Grade 36
- G. High Strength Tension Control Threaded Fasteners: Meet requirements of ASTM A 325 or ASTM A 490.
- H. Headed Anchor Shear Studs: By the Nelson Division of TRW.
- I. Welding Electrodes: E 70 Series.
- J. Shop Primer Paint: Fabricators standard rust inhibitive primer.
- K. Non-Metallic, Non-Shrink Grout: Meets the requirements of ASTM C 1107.
- L. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time. Grout shall have a minimum 28 day compressive strength of 6,000 psi.
  - 1. Subject to compliance with requirements, provide products by one of the following or an approved equal:
    - a. Five Star Fluid Grout 100; Five Star Products, Inc., Fairfield, Connecticut.
    - b. Crystex; L&M Construction Chemicals, Inc. Omaha, Nebraska.
    - c. Sure-Grip High Performance Grout; Dayton superior Corp., Miamisburg, Ohio.
    - d. SonnogROUT 10K; Sonneborn Building Products, Shakopee, Minnesota.
    - e. Sealight Pac-It Grout; W.R. Meadows, Inc., Hampshire, Illinois.

- f. Enduro 50; Conspec Marketing & Manufacturing Co., Inc, Kansas City, Kansas.

## **2.2 FABRICATION**

- A. Fabrication shall be in accordance with the AISC "Code of Standard Practice for Buildings and Bridges".
- B. Connections: Weld or bolt shop connections as indicated on the approved shop drawings. Design connections to support reactions and forces where indicated on the drawings.
- C. Shop Welds: Shall be visually inspected by the Fabricator's quality control department.

## **2.3 SHOP PAINTING**

- A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete, mortar or to receive sprayed on fireproofing. Paint embedded steel, which is partially exposed on exposed portions and initial 2 inch of embedded areas only.
- B. Do not paint surfaces, which are to be welded or high-strength bolted with friction-type connections.
- C. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:
  - 1. SP-1 "Solvent Cleaning"
  - 2. SP-2 "Hand Tool Cleaning"
- D. Painting: After surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions. Provide one coat.

## **PART 3 - EXECUTION**

### **3.1 COORDINATION**

- A. Field Measurements: Verify all elevations, locations, and dimensions of surfaces to receive structural steel.
- B. Anchor Bolts and Other Embedded Items: Verify locations and positions of anchor bolts and other embedded items used to support structural steel.

All Anchor bolts for column base plates, anchors and bearing plates for beams shall be located prior to installation by a Registered Professional surveyor. The Professional Surveyor shall use project control points, such as bench marks, grid lines, or building corners established and accurately maintained by the General Contractor for vertical and horizontal control of location. Templates shall be used to locate groupings of bolts or anchors and shall be confirmed as to orientation and hole geometry accuracy.

Anchor bolts and bearing plates with anchors shall be stabilized against movement, vertical and horizontal, prior to and during concrete casting of concrete supporting these devices.

Upon completion of the concrete casting the Professional Surveyor shall verify vertical and horizontal locations and orientation of anchor bolts or bearing plates with anchors. A report shall be furnished to the Engineer of Record (through the General Contractor and Architect) noting non compliant locations.

The EOR, will furnish remedial actions required to correct the non compliant anchor bolt or bearing plate locations. Allow ten days for the EOR's report on remedial actions necessary.

It shall be the General Contractor's responsibility to have this work performed.

C. Correct any unsatisfactory conditions prior to erection of structural steel.

### **3.2 PREPARATION**

A. Clean surfaces to receive structural steel prior to erection.

### **3.3 ERECTION**

- A. General: Erect structural steel in accordance with AISC "Code of Standard Practice for Steel Buildings and Bridges".
- B. Field Assembly: Assemble structural steel accurately to the lines and elevations shown on the drawings. Align and adjust components accurately before fastening.
- C. Temporary Bracing: Provide temporary bracing or guys to secure structural steel against wind, seismic, or construction loads. It is the responsibility of the Contractor to maintain stability of the structure during erection.
- D. Field Bolted Connections: Install high strength tension control bolts in accordance with AISC Specifications for Structural Joints Using ASTM A325 and A490 Bolts and the manufacturer's instructions. Where clearance within a connection does not permit the use of tension control bolts, standard A325 bolts shall be used and inspected in accordance with the AISC Specification for Structural Joints.
- E. Field Welding: Perform all welds in accordance with AWS.
- F. Welded Connections: Field welds shall be visually inspected according to AWS D1.1/D1.1M.
  - a. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - i. Liquid Penetrant Inspection: ASTM E 165.
    - ii. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - iii. Ultrasonic Inspection: ASTM E 164.
    - iv. Radiographic Inspection: ASTM E 94
- G. Gas Cutting: Do not use gas-cutting torches in field to cut structural framing.
- H. Do not enlarge unfair holes by burning. Ream holes that must be enlarged to admit bolts.
- I. Field Touch-up Painting (Primer): Paint all exterior exposed bolts, washers, and nuts after connections have been tightened and checked. Paint all exterior exposed field welds. Paint all exterior exposed abrasions in shop coat. Use same paint as for shop painting.

- J. Grout Placement: Comply with the manufacturer's instructions.
- K. Tighten anchor bolts after supported members have been positioned and plumbed.

**END OF SECTION**



**ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.2 RELATED WORK SPECIFIED ELSEWHERE**

- A. Structural Steel – Section 051 10 00
- B. Steel Joists - Section 05 21 00
- C. Metal Deck - Section 05 30 00
- D. Painting and Coating – Section 09 90 00

**1.3 SUMMARY**

- B. Section includes architecturally exposed structural-steel (AESS).
  - 1. Division 5 - "Structural Steel Framing" also apply to AESS.
- C. Related Requirements:
  - 1. Division 5 - "Structural Steel Framing" for additional requirements applicable to AESS.
  - 2. Division 5 – "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
- Division 9 - "Painting" and "High-Performance Coatings"

**1.4 DEFINITIONS**

- D. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

**1.5 COORDINATION**

- E. Coordinate selection of shop primers with topcoats to be applied per Division 9 - "Painting" and "High-Performance Coatings". Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

## 1.6 PREINSTALLATION MEETINGS

F. Preinstallation Conference: See Division 5 - "Structural Steel Framing"

## 1.7 ACTION SUBMITTALS

G. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections. Indicate orientation of bolt heads.
5. Indicate exposed surfaces and edges and surface preparation being used.
6. Indicate special tolerances and erection requirements.

H. Samples: Submit Samples of AESS to set quality standards for exposed welds.

1. Two steel plates, 3/8 by 8 by 4 inches (9.5 by 200 by 100 mm), with long edges joined by a groove weld and with weld ground smooth.
2. Steel plate, 3/8 by 8 by 8 inches (9.5 by 200 by 200 mm), with one end of a short length of rectangular steel tube, 4 by 6 by 3/8 inches (100 by 150 by 9.5 mm), welded to plate with a continuous fillet weld and with weld ground smooth and blended.
3. Round steel tube or pipe, minimum 8 inches (200 mm) in diameter, with end of another round steel tube or pipe, approximately 4 inches (100 mm) in diameter, welded to its side at a 45-degree angle with a continuous fillet weld and with weld ground smooth and blended.

## 1.8 INFORMATIONAL SUBMITTALS

I. Qualification Data:

1. Installer/Erector.
2. Fabricator.
3. Welder.

J. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

## 1.9 QUALITY ASSURANCE

1. Fabricator Qualifications:

- a. A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU: Certified Building Fabricator.
  - b. Minimum of 5 years' experience fabricating steel for jobs of similar size and complexity.
- 2. Installer Qualifications:
    - a. Minimum of 5 years' experience erecting structural steel for jobs of similar size and complexity.
  - 3. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- K. -Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- L. Mockups: Build mockups of AESS to set quality standards for fabrication and installation.
- 1. Build mockup of typical portion of AESS as shown on Drawings.
  - 2. Coordinate painting requirements with Division 9 - "Paintings" and "High-Performance Coatings".
  - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### **1.10 DELIVERY, STORAGE, AND HANDLING**

- M. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
- 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

#### **1.11 FIELD CONDITIONS**

- N. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

### **PART 2 - PRODUCTS**

#### **2.1 BOLTS, CONNECTORS, AND ANCHORS**

- A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
- 1. Finish: Plain unless noted otherwise.

## 2.2 FILLER

- B. Filler: Polyester filler intended for use in repairing dents in automobile bodies.

## 2.3 PRIMER

- C. Primer: Comply with Division 9 - "Paints and Coatings".
- D. Galvanizing Repair Paint: ASTM A 780/A 780M.
- E. Shop Primer for Galvanized Steel: MPI#26, cementitious galvanized metal primer.

## 2.4 FABRICATION

- F. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- G. In addition to special care used to handle and fabricate AESS, comply with the following:
  - 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
  - 2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.
  - 3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
  - 4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
  - 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
  - 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
  - 7. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
  - 8. Fabricate AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
  - 9. Seal-weld open ends of hollow structural sections with 3/8-inch (9.5-mm) closure plates for AESS.
- H. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.
  - 1. Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet (6 m) under any lighting conditions.
  - 2. Tolerances for walls of hollow steel sections after rolling shall be approximately 1/2 inch (13 mm).
- I. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch (3.2 mm) with a tolerance of 1/32 inch (0.8 mm) for AESS.
- J. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

- K. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

## 2.5 SHOP CONNECTIONS

- L. 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.
1. Joint Type: Snug tightened unless noted otherwise.
- M. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
  2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
  3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
  4. Provide continuous welds of uniform size and profile where AESS is welded.
  5. Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus zero inch (plus 1.5 mm, minus zero mm) for AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.
  6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
  7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
  8. Make fillet welds for AESS oversize and grind to uniform profile with smooth face and transition.
  9. Make fillet welds for AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

## 2.6 GALVANIZING

- N. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
  2. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
  3. Galvanize. As shown on drawings.

**Commented [CR1]:** I do not see a need for galvanizing in Dilkon unless we have a cooling tower or source of moisture beyond rain or snow. It is very dry there.

## 2.7 SHOP PRIMING

- O. 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 (50 mm).
  2. Surfaces to be field welded.
  3. Surfaces to be high-strength bolted with slip-critical connections.
  4. Surfaces to receive sprayed fire-resistive materials.
  5. Galvanized surfaces.
- P. 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:
6. SSPC-SP 3, "Power Tool Cleaning."
  7. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- Q. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- R. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions per Division 9 - "Painting" and "High-Performance Coatings". Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

Commented [CR2]: Per above may not need.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- D. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

### **3.3 ERECTION**

- E. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
  - 1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
  - 2. Erect AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
- F. Do not use thermal cutting during erection.

### **3.4 FIELD CONNECTIONS**

- G. 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 unless noted otherwise.
  - 2. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections.
- H. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.
  - 1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.
  - 2. Remove erection bolts in AESS, fill holes, and grind smooth.
  - 3. Fill weld access holes in AESS and grind smooth.

### **3.5 FIELD QUALITY CONTROL**

- I. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Division 5 "Structural Steel Framing." The testing agency is not responsible for enforcing requirements relating to aesthetic effect.
- J. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

### **3.6 REPAIRS AND PROTECTION**

- K. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.
- L. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

**END OF SECTION**

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2019-03-15**

**ARCH. EXP. STRUCTURAL STEEL FRAMING**



## SECTION 05 3000

### METAL DECKING

#### PART 1 - GENERAL

##### 1.1 WORK INCLUDED

- A. Provide all metal decking complete in place as shown on the drawings, specified herein, and needed for a complete and proper installation.

##### 1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Structural Steel - Section 05 1000
- B. Steel Joists - Section 05 2100
- C. Cold-Formed Metal Framing - Section 05 4000
- D. Painting and Coating – Section 09 90 00

##### 1.3 QUALITY ASSURANCE

- A. Reference Standards:
  - 1. Qualification of Field Welders: Welders shall be certified in accordance with AWS D1.3 within the last 12 months.
  - 2. ASTM International, latest versions.
    - a. ASTM A 653/  
A653M                      Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
    - b. A 1008/  
A 1008M                      Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low Alloy with Improved Formability
    - c. ASTM A 1011/  
A 1011M                      Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, and Ultra- High-Strength
  - 3. American Welding Society (AWS), latest edition.
    - a. D1.3                      Structural Welding Code - Sheet Steel
  - 4. Steel Deck Institute.
    - a. SDI                      Design Manual for Floor Decks, Form Decks and Roof Decks
    - b. SDI                      Diaphragm Design Manual Third Edition

## **1.4 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories.
- B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Shop Drawings shall not be made by reproduction of the Contract Drawings.

## **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Support metal deck above ground on skids, pallets, platforms or other supports.
- B. Protect metal deck from damage.
- C. Store packaged materials in original unbroken package or container.
- D. Waste Management and Disposal: As specified in Division 01 Section "Construction Waste Management" and as follows:
  - 1. Collect off cuts and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Metal Roof Deck: ASTM A 1008, Grade C. See plans for type, size and finish. Metal deck used in fire rated assemblies shall meet the requirements of UL. The UL mark on the product will be accepted as evidence of compliance.
- B. Metal Floor Deck: ASTM A 1011 with galvanized finish. See plans for type and size.
- C. Finishes:
  - 1. Painted: Manufacturer's baked-on, rust-inhibitive paint.
  - 2. Galvanized: Conform to ASTM A 653, G60.

## **PART 3 - EXECUTION**

### **3.1 COORDINATION**

- A. All edge angle shall be in place with proper attachment prior to installation of metal deck. All roof and floor opening frames shall be installed prior to deck installation.

### **3.2 INSTALLATION**

- A. General: Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein. Locate deck bundles to prevent overloading of structural members.

- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
- C. Place deck units in straight alignment for entire length of run.
- D. Place deck units flat and square secured to adjacent framing without warp or excessive deflection.
- E. Lap ends of deck units a minimum of 2 inches over supports.
- F. Place deck units to permit proper attachment to the perimeter deck angle.
- G. Do not use deck units for storage or working platforms until permanently secured.
- H. Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
- I. Fasten deck units to steel supporting members as shown on the structural drawings.
- J. Fasten side laps of units as called for on the structural drawings.
- K. Care shall be exercised in the selection of electrodes and amperage to provide positive welds and to prevent high amperage blowholes.
- L. Comply with AWS D1.3 requirements and procedures.
- M. Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.
- N. Install closure strips at all locations as recommended by the manufacturer to provide a complete installation.
- O. Provide cleaning and touch-up painting of field welds, abraded areas and rust spots, as required for all exposed areas after erection and before proceeding with field painting.

**END OF SECTION**

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2019-03-15

05 3000 - 4

**METAL DECKING**

**METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK**

- A. Definition: Metal fabrications include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of metal systems specified elsewhere.
- B. Extent of metal fabrication is indicated on the Drawings and schedules.
- C. Types of work in this section include metal fabrications for:
  - 1. Rough hardware.
  - 2. Bollards.
  - 3. Steel pipe railings.
  - 4. Safety grip treads.
- D. Structural steel is specified in another section within Division 5.

**1.2 QUALITY ASSURANCE**

- A. Reference Standards: See Section 01090.
  - 1. American Institute for Steel Construction (AISC)
    - a. Work shall conform to the AISC Manual of Steel Construction and the Code of Standard Practice for Steel Buildings and Bridges, except as modified by deleting the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any connection designed by the fabricator in preparation of the shop drawings".
  - 2. ASTM International, latest versions.
    - a. ASTM A 27                      Standard Specification for Steel Castings, Carbon, for General Application  
A 27M
    - b. ASTM A 36/  
A36M                              Standard Specification for Carbon-Structural Steel
    - c. ASTM A 47/  
A 47M                              Standard Specification for Ferritic Malleable Iron Castings

d.	ASTM A 53/ A 53M	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless
e.	ASTM A 153/ A 153M	Standard specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
f.	ASTM A 283/ A 283M	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
g.	ASTM A 307	Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
h.	ASTM A 501	Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
i.	ASTM A 1008/ A 1008M	Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low Alloy, High-Strength Low Alloy with Improved Formability
j.	ASTM A 1011/ A 1011M	Standard Specification for Steel, Sheet and Strip, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low Alloy with Improved Formability, and Ultra-High Strength
k.	ASTM E 935	Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings

- B. Take field measurements prior to the preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. Allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work. Coordinate measurements prior to the preparation of shop drawings and fabrication to ensure proper fitting of the work.
- C. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D. Qualifications for Welding Work: Use welding processes and welding operations which qualify with AWS "Standard Qualification Procedure".

### 1.3 SYSTEM PERFORMANCES

- A. Structural Performances: Provide assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.
- B. Provide handrails capable of withstanding the following loads applied as indicated when tested per ASTM E 935.
  - 1. Concentrated loads of 200 lbs. applied at any point in any direction.
  - 2. Uniform load of 50 lbs. per linear ft. applied simultaneously in both vertical and horizontal directions.
  - 3. Concentrated and uniform loads above need not be assumed to act concurrently.

#### **1.4 SUBMITTALS**

- A. See Sections 01 3300 and 01 7823.
  - 1. Catalog Data: Submit manufacturer's catalog data, specifications, and anchor details for products used in miscellaneous metal fabrications, including paint products and grout.
  - 2. Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Furnish templates for anchor bolt installation.
  - 3. Where materials or fabrications are to comply with stated requirements for design loading, include structural computations, material properties and other information used in structural analysis.
- B. Waste Management and Disposal: As specified in Division 01 Section "Construction Waste Management" and as follows:
  - 1. Collect off cuts and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Waste Management: Collect off cuts and scrap and place in designated area for recycling in accordance with the Waste Management Plan and local recycler standards.

## **PART 2 – PRODUCTS**

### **2.1 MATERIALS**

#### **A. Metals:**

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Use steel plates, shapes and bars complying with ASTM A 36.
3. Use bent or cold formed steel plates complying with ASTM A 283, Grade C.
4. Use steel bars and bar-size shapes complying with ASTM A 36.
5. Use hot-rolled steel tubing complying with ASTM A 501.
6. Use hot-rolled structural steel sheet complying with ASTM A 1011, Grade 33; or use cold-rolled complying with ASTM A 1008, Class 1; or grade required for design loading.
7. Use steel pipe complying with ASTM A 53, Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
8. Use cold finished steel bars complying with ASTM A 108, Grade as selected by fabricator.
9. Use cold rolled carbon steel sheets complying with ASTM A 1008.
10. Use cast or formed metal brackets, flanges and anchors of the same type material and finish as supported rails, unless otherwise indicated.
11. Use threaded or wedge type concrete inserts with galvanized ferrous casting, either malleable iron complying with ASTM A 47 or cast steel complying with ASTM A 27. Furnish and install hot-dip galvanized bolts, washers and shims as required to comply with ASTM A 153.

#### **B. Fasteners:**

1. General: Furnish and install zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.



2. Use regular hexagon head type anchor bolts and nuts, ASTM A 307, Grade A.
  3. Use square head type lag bolts, FS FF-B-561.
  4. Use cadmium plated steel machine screws, FS FF-S-92.
  5. Use flat head carbon steel wood screws, FS FF-S-111.
  6. Use round plain carbon steel washers, FS FF-W-92.
  7. Use anchors conforming to the following requirements:
    - a. Use threaded type concrete inserts with galvanized ferrous castings, internally threaded to receive  $\frac{3}{4}$  inch diameter machine bolts; either malleable iron complying with ASTM A 47, or cast steel complying with ASTM A 27 hot-dip galvanized complying with ASTM A 153.
  8. Use helical spring type carbon steel lock washers, FS FF-W-84.
- C. Paint:
1. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.
  2. Use high zinc dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20.

## 2.2 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in the finished product for use intended. Use type of materials indicated or specified for various components of work.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise indicated. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts.

- E. Provide for anchorage of the type shown and required to support the structure either as shown on the Drawings or for temporary or permanent erection. Fabrication and spacing of anchoring devices shall provide adequate support for their intended use.
- F. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- G. Use hot-rolled steel bars for work fabricated from bar stock, unless work is indicated to be fabricated from cold finished or cold-rolled stock.
- H. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:
  - 1. ASTM A 153 for galvanizing iron and steel hardware.
  - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8 inch thick and heavier.
- I. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- J. Apply shop primer to surfaces of metal fabrication except those which are galvanized or indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
- K. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications.
  - 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".
  - 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

### **2.3 ROUGH HARDWARE**

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division-6 sections.
- B. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

### **2.4 LOOSE BEARING AND LEVELING PLATES**

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

## **2.5 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes and plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
  - 1. Except as otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units of 1- ¼ inch X ¼ inch X 8 inch steel straps.
- D. Galvanize miscellaneous frames and supports where indicated.

## **2.6 MISCELLANEOUS STEEL TRIM**

- A. Provide shapes and sections indicated for profiles shown. Unless otherwise indicated fabricate units from structural steel shapes, plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

## **2.7 STEEL PIPE HANDRAILS**

- A. Fabricate steel pipe handrail to meet design requirements for location indicated. Provide handrail members formed of pipe sizes and wall thickness not less than that required to support design loading.
- B. Interconnect handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
  - 1. At tee and cross intersections provide coped joints.
  - 2. At bends interconnect pipe by means of prefabricated elbow fittings of flush radius bends, as applicable, of radiuses indicated.
- C. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.

- D. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings.
- E. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for attachment of handrails to other work. Furnish inserts and other anchorage devices for connecting handrails to concrete or masonry work.

## **2.8 SAFETY GRIP TREADS**

- A. Provide exterior stair treads with Type 101 Alumogrit by Wooster Products, Inc. Provide safety treads 4 inches wide by width of stairs less 8 inches. Provide concealed steel integral anchors at 24 inches on center.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

### **3.2 INSTALLATION**

- A. General:
  - 1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, through-bolts, wood screws and other connectors as required.
  - 2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete or similar construction.
  - 3. Fit exposed connections accurately together to form tight hairline joints. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
  - 4. Field welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

5. Setting Loose Plates: Clean concrete bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
  
6. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
  - a. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

### **3.3 ADJUST AND CLEAN**

- A. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in a section within Division 9.
- B. For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

### **3.4 SAFETY GRIP TREADS**

- A. Install safety grip treads with anchorage system embedded into concrete stairs to comply with the manufacturer's recommendations.

**END OF SECTION**

17-13 OSU, College of Osteopathic Medicine at  
Cherokee Nation  
Childers Architect  
2019-03-15

**METAL FABRICATIONS**

05 5000 - 10

## **SECTION 05 5100**

### **METAL STAIRS**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY – DESCRIPTION OF WORK**

- A. Section Includes: This Section specifies prefabricated metal stairs and railings.
- B. Related Requirements:
  - 1. Section 03 3000 - Cast-in-Place Concrete
  - 2. Section 05 1000 - Structural Steel
  - 3. Section 05 5000 – Metal Fabrications
  - 4. Painting and Coating – Section 09 90 00

##### **1.2 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. ASTM International (ASTM), latest versions.
    - a. ASTM A36 Standard Specification for Carbon Structural Steel.
    - b. ASTM A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - c. ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
    - d. ASTM A513 Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
    - e. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
    - f. ASTM A1008 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
    - g. ASTM A1011 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
  - 2. American Welding Society (AWS):
    - a. AWS D1.1 Structural Welding Code - Steel.
    - b. AWS D1.3 Structural Welding Code - Sheet Steel.

3. American National Standards Institute (ANSI):
  - a. ANSI A117.1 Accessible and Usable Buildings and Facilities Standards.
4. The Society for Protective Coatings (SSPC):
  - a. SSPC-SP3 Power Tool Cleaning.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays. Comply with Section 01 31 00 - Project Management and Coordination, if applicable.
- B. Sequencing: Sequence work of this section in accordance with Section [01 12 16 - Work Sequence and manufacturer's written recommendations for sequencing construction operations] if applicable.
- C. Scheduling: Schedule work of this Section in accordance with Section 01 3200 – Construction Progress Documentation, if applicable.

### **1.4 ACTION SUBMITTALS**

- A. General: Submit listed submittals in accordance with Contract Conditions and Section 01 3300 - Submittal Procedures.
- B. Product Data: Submit specified products as follows:
  1. Manufacturer's product data.
  2. Manufacturer's installation instructions.
- C. Shop Drawings: Indicate information on shop drawings as follows:
  1. Stair plans, elevations, details, methods of installation and anchoring.
    - a. Show members, sizes and thickness, anchorage locations and accessory items.
    - b. Furnish setting diagrams for anchorage installation as required.
    - c. Include calculations stamped by a structural engineer registered in the jurisdiction in which the project is located.
- D. Samples: Submit as follows:
  1. Two samples, minimum size 6 inches (152 mm) square, representing actual product, finish and patterns for each finished tread product specified.

### **1.5 INFORMATION SUBMITTALS**

- A. General: Submit listed submittals in accordance with Contract Conditions and Section 01 3300 - Submittal Procedures.



- B. Manufacturer's Instructions: Submit manufacturer's storage and installation instructions.
- C. Source Quality Control: Submit documentation verifying that components and materials specified in this Section are from single manufacturer.
- D. Qualification Statements:
  - 1. Submit certificate verification that manufacturer is American Institute of Steel Construction (AISC) Certified for Standard Steel Building Structures.
  - 2. Submit letter of verification for Installer's Qualifications.

## **1.6 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Manufacturer:
    - a. American Institute of Steel Construction (AISC) Certified firm having 10 years experience manufacturing components similar to or exceeding requirements specified in scope of project.
    - b. Having sufficient capacity to produce and deliver required materials without causing delay in work.
  - 2. Installer: Acceptable to manufacturer.

## **1.7 DELIVERY, STORAGE & HANDLING**

- A. Delivery and Acceptance Requirements:
  - 1. Deliver material in accordance with Section 01 6000 - Product Requirements and in accordance with manufacturer's written instructions.
  - 2. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
- B. Storage and Handling Requirements:
  - 1. Store materials protected from exposure to harmful weather conditions and at temperatures recommended by manufacturer.
- C. Packaging Waste Management:
  - 1. Separate waste materials for reuse and recycling in accordance with Section 01 7419 - Construction Waste Management and Disposal.
  - 2. Remove packaging materials from site and dispose of at appropriate recycling facilities.
  - 3. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate onsite bins for recycling.
  - 4. Fold metal and plastic banding; flatten and place in designated area for recycling.
  - 5. Remove:

- a. Pallets from site and return to supplier or manufacturer.

## **PART 2 - PRODUCTS**

### **2.1 METAL STAIRS**

- 1. Single Source Responsibility: Provide components and materials specified in this section from a single American Institute of Steel Construction (AISC) Certified manufacturer.
- 2. Substitution Limitations:
  - a. Substitutions: In accordance with Section 01 2500 - Substitution Procedures.
- B. Description:
  - 1. Sustainability Characteristics:
    - a. In accordance with general project requirements.
  - 2. Compatibility:
    - a. Ensure components and materials are compatible with specified accessories and adjacent materials.
- C. Design Criteria:
  - 1. Structural Performance of Stairs: Stairs shall withstand the following structural loads without exceeding the allowable design working stress of materials, including anchors and connections. Apply each load to produce the maximum stress in each component:
    - a. Treads and Platforms of Metal Stairs: Capable of withstanding a uniform load of 100 psf (4.8 kN/m<sup>2</sup>) and concentrated load of 300 lbf (1.33 kN) applied on an area of 4 square inches (2581 square mm). Concentrated and uniform loads need not be assumed to act concurrently.
    - b. Stair Framing: Capable of withstanding stresses resulting from loads specified, in addition to stresses resulting from railing system loads.
    - c. Limit Deflection of Treads, Platforms and Framing Members: To L/240.
  - 2. Structural Performance of Handrails and Railings: Handrails and railings shall withstand the following structural loads without exceeding the allowable design working stress of materials, including handrails, railings, anchors and connections.
    - a. Top Rail of Guardrail: Capable of withstanding a concentrated load of 200 lbf (0.89 kN) applied in any direction and a uniform load of 50 psf (2.39 kN/m<sup>2</sup>) applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently.
- D. Standard Stair and Rail System:

1. Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet stringers, risers, treads, landings, fasteners/supports and railings.
  - a. Stringers:
    - 1) Steel plate or channel with side mounted prefabricated railings.
    - 2) Minimum thickness or gage as determined by structural design calculations, structural grade steel plate or channel.
  2. Risers: Closed riser, minimum 14 gage (1.9 mm) hot rolled mild steel sheet, sloped maximum 1 1/2 inches (38.1 mm) and conforming to Americans with Disabilities Act (ADA) nosing requirements.
  3. Treads: Manufacturer's standard concrete pan system, field poured. Tread pans to be minimum of 14 gage (1.9 mm), or as determined by design calculations. Pan depth 1 1/2 inches (38.1 mm). Exposed welds from the bottom side of flight assemblies will not be allowed. All welds to be from topside of tread pans as recommended by manufacturer.
  4. Mid Landings: Minimum of 12 gage (2.7 mm) hot-rolled mild steel sheets, formed for a minimum 2 1/2 inches (64 mm) concrete fill, with 11 gage channel supports and bracing welded to perimeter frame at 12 inches (305 mm) on center.
  5. Fasteners and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be a minimum of 5/8 inch (15.9 mm) diameter steel rod, with actual size based on stair load.
  6. Manufacturer's standard welded steel tube railing system complying with the following requirements:
    - a. Rails: 1 1/2 inches (38.1 mm) diameter x 13 gage (2.3 mm) minimum round steel tube, continuous multi-strand type, equally spaced with not more than 3 15/16 inches (100 mm) clearance between strands and with a minimum extension per code at top and bottom risers. Wrap rail continuously past space between flights to form guardrail as required by building code. Terminate rail ends with radiused returns, newel posts or safety terminations approved by local code. Provide not less than 1 1/2 inches (38.1 mm) clearing between rail and wall.
    - b. Rail Posts: 1 1/2 inches (38.1 mm) square x 11 gage (3 mm) tubing. Rail posts to fasten to side of plate stringers per manufacturer's shop drawings. Manufacturer to pre-weld erection aid to rail post for proper height to aid stair erector. Erection aid (setting block) to be removed and weld-ground smooth after installation.
    - c. Fabrication:
      - 1) Use preformed or prefabricated bends.
      - 2) Butt weld tee and cross intersections in tubing. Cope and weld intersections in pipe. Miter elbows.

- 3) Mechanically fasten internal sleeves and fittings.
- 4) Provide minimum 12 gage (2.7 mm) welded steel plate closures or hemispherical closure fittings on all exposed rail ends.

E. Custom Stair and Rail System:

1. Support System: Provide landing support with manufacturer's standard system. Comply with details indicated on Drawings.
  - a. Hanger rod landing supports.
  - b. Tube strut landing supports.
  - c. Shelf angle landing supports.
  - d. Knockdown (KD) landing supports.
2. Rail System: Provide rail system. Comply with details indicated on Drawings.
  - a. Standard 34 inch (864 mm) height handrail system with 42 inch (1067 mm) guardrails at landings and openings.
    - 1) Rail Type: Full mesh panel rail, Picket style rail, 5-Line sweep rail, or Perforated panel rail, unless noted otherwise by architectural drawings.
  - b. Standard 36 inch (914 mm) height handrail system with 42 inch (1067 mm) guardrails at landings and openings.
    - 1) Rail Type: Full mesh panel rail, Picket style rail, 6-Line sweep rail, or Perforated panel rail, unless noted otherwise by architectural drawings.
  - c. Standard 42 inch (1067 mm) height guard rail system with 34 inch (864 mm) ADA Grab and with 42 inch (1067 mm) guardrails at landings and openings.
    - 1) Rail Type: Full mesh panel guard rail with hand rail, Picket style guard rail with handrail, 7-Line sweep guard rail with handrail, or Perforated panel guard rail with handrail, unless noted otherwise by architectural drawings.
3. Wall Handrails: Match stair handrails. Provide manufacturer's standard pressed steel wall brackets with anchors suitable for supporting construction.
4. Tread Construction: Comply with details indicated on Drawings.
  - a. 1 1/2 inch (38.1 mm) pan type treads for field-poured concrete.
    - 1) Acceptable Material: Field-Poured Reinforced Concrete Treads.

F. Materials:

1. Steel Shapes and Plates: To ASTM A36.

2. Steel Pipe: To ASTM A53 Type E or S, Grade B.
  3. Steel Tubing:
    - a. Structural Use: To ASTM A500, Grade B or C.
    - b. Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).
  4. Steel Sheet:
    - a. Structural Use: To ASTM A1011 (hot rolled).
    - b. Non-Structural Use: To ASTM A786, ASTM A1008.
  5. Fasteners: As recommended by manufacturer.
  6. Welding Rods: In accordance with AWS code and AWS filler metal specifications for material being welded.
  7. Primer: HAPS-free, solvent-based, rust inhibitive primer containing less than 3.5 lb/gal (1.6 kg/L) Volatile Organic Compounds (VOC) and compatible with conventional alkyds topcoats.
- G. Fabrication:
1. Use same material and finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.
  2. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.
  3. Construct stairs and rails with all components necessary for support and anchorage, and for a complete installation.
- H. Finishes
1. Rails and Stair Components: Completely remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from steel surface in accordance with SSPC SP3.
  2. Shop Primer: Immediately after fabrication and cleaning, spray apply primer to dry film thickness recommended by the primer manufacturer, but not less than 2.0 mil thickness. Apply one coat High Solids Red Oxide Anticorrosive primer meeting SSPC-15 Paint.

## 2.2 ACCESSORIES

- A. Anchor bolts, clip angles, hanger rods, hardware and incidental materials required for complete installation, as recommended by the manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer's instructions prior to metal stair and railing installation.
  - 1. Inform Architect of unacceptable conditions immediately upon discovery.
  - 2. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Architect.

### **3.2 PREPARATION**

- A. Ensure structure or substrate is adequate to support metal stairs and railings.

### **3.3 INSTALLATION**

- A. Coordinate installation of metal stairs and railings in accordance with Section 01 7300 - Execution.
- B. Coordinate metal stairs and railings work with work of other trades for proper time and sequence to avoid construction delays.
- C. Install stairs, landings and handrails in accordance with manufacturer's instructions. Install square, plumb, straight and true to line and level, with neatly fitted joints and intersections.
  - 1. Do not cut or alter structural components without written authorization.
  - 2. Field welding and joining shall conform to AWS D1.1 and AWS D1.3.
  - 3. Grind all exposed welds smooth and touch-up shop-primed areas with same primer as used by manufacturer.

### **3.4 ADJUSTING**

- A. Adjust components and systems for correct function and operation in accordance with manufacturer's written instructions.

### **3.5 CLEANING**

- A. Perform cleanup in accordance with Section 01 7416 - Cleaning Up (Site Maintenance).
- B. Upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 16 – Clean Up (Site Maintenance).
- C. Waste Management:
  - 1. Coordinate recycling of waste materials with Section 01 74 19 - Construction Waste Management and Disposal.
  - 2. Collect recyclable waste and dispose of or recycle field generated construction waste created during demolition, construction or final cleaning.
  - 3. Remove recycling containers and bins from site.

**END OF SECTION**

## SECTION 05 6000

### MEDICAL EQUIPMENT SUPPORT SYSTEMS

#### PART 1 – GENERAL

##### 1.1 SCOPE OF WORK

- A. Contractor shall provide and install medical equipment support systems as indicated on the Contract Drawings.
- B. In order to accommodate original and future similar equipment, support systems shall be a “Universal Grid” type fabricated from a “Strut System” (i.e. B-Line®). See the Architectural Reflected Ceiling Plans for required locations of the grid support systems. Strut System channel rails shall extend wall to wall perpendicular to the path of travel of the equipment. Rails shall be on 2'-2" centers, permitting standard size (24") ceiling panels, light fixtures, and HVAC grilles to fit between them. Rails shall be installed in such a manner as to permit continuous attachment along any point on the rail. System shall be true, plumb, and level and meet the tolerances required by the equipment manufacturer, when loading conditions are applied due to equipment operation.
- C. Surgical light, exam light and monitor support systems shall provide a rigidly supported plate and/or threaded rod studs at or below ceiling level, as required by the equipment manufacturer and as indicated on the Medical Equipment Drawings.
- D. Provide all equipment, labor, supervision, design and fabrication required for installation of the Medical Equipment Support System in accordance with the Contract Drawings and as specified herein.
- E. Finish painting of the exposed portions of the support system, if required, to be performed by the painting contractor.
- F. Related work specified elsewhere: Ceiling; Electrical; HVAC; Painting; Other.

##### 1.2 QUALITY ASSURANCE

- A. Manufacturer's qualifications - The manufacturer shall not have had less than 10 year's experience in manufacturing Strut Systems.
- B. Installer's qualifications - Due to the potential need to make last minute changes to accommodate field conditions, the Contractor must be specifically trained in the design and installation of medical equipment supports using Strut Systems, with not less than five years practical experience in the design and installation of medical equipment supports.
- C. Standards
  - 1. Work shall meet the requirements of the following standards:
    - a. Federal, State and Local Codes

- b. American Iron and Steel (AISI) Specification for the Design of Cold-Formed Steel Structural Members
- c. American Society for Testing and Materials (ASTM)

### **1.3 SUBMITTALS**

- A. Shop drawings
  - 1. Submit all shop/assembly drawings necessary to install the Medical Equipment Support System in compliance with the Contract Drawings.
  - 2. Submit all pertinent manufacturers' published data. Manufacturers' catalog shall show materials, strengths, finishes and sizes. Sufficient engineering information shall be provided to permit stress calculations.
  - 3. The medical support system shall lend itself to a rational structural analysis.

### **1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. All material is to be delivered to the work site properly packaged to avoid damage.
- B. Upon delivery to the work site, all components shall be protected from the elements by a shelter or other covering.

### **1.5 GUARANTEE**

- A. Materials shall be warranted by manufacturer for a period of one year against defects in materials and workmanship.
- B. Installation shall be warranted by contractor for a period of one year against defects in workmanship.

## **PART 2 – PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. All Strut System components shall be as manufactured by UniStrut, B-Line Systems, Inc., or approved equal as determined by the Architect or Engineer of record in writing 10 days prior to bid date.
- B. Some Components necessary for construction, but not manufactured as standard components of the Strut System may be fabricated by the contractor, using only materials of quality comparable to the Strut System. All welding must be performed by a certified welder.

### **2.2 MATERIALS**

- A. All channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications:
  - A 570 Gr 33
  - A 446 Gr A
- B. All fittings shall be fabricated from steel conforming to the following ASTM specifications:
  - A635



- C. Materials that appear damaged or distressed shall not be used and will not be accepted.
- D. The Engineer of Record must approve any substitutions of product or manufacturer. Approvals must be made in writing ten days prior to bid date.

## **2.3 FINISHES**

- A. Strut System components shall be finished in accordance with one of the following standards:
  - 1. DURA-GREEN (GR) Water-borne epoxy coating applied by cathodic electro-deposition after cleaning and phosphatizing, and thoroughly baked.
  - 2. ELECTRO-PLATED ZINC (EG) Electrolytically zinc coated per ASTM B633.
  - 3. PRE-GALVANIZED (PG) Zinc coated by hot-dipped process prior to roll forming Zinc weight
  - 4. HOT-DIPPED GALVANIZED (HG) Zinc coated after all manufacturing operations are complete. Coating shall conform to ASTM A 123 or A153.

## **2.4 DESIGN**

- A. SUPPORT STRUCTURE: The support members at the ceiling plane shall be located as indicated on the Medical Equipment Drawings. The system shall be adequately braced to prevent unacceptable movement during equipment use.
- B. SURGICAL AND EXAM LIGHT SUPPORTS: The support members at the ceiling plane shall be located as indicated on the drawings. It shall be possible to attach lights to support and adjust leveling/mounting plate without modification to the support.
- C. CEILING ANCHORAGE: Wherever possible, attachment to structure above ceiling shall be by means of thru-bolts or beam/joist clamps to the structural framing of the building.
- D. VERTICAL SUPPORTS: The exposed rails and the ceiling anchorage shall be connected by a series of adjustable telescoping square tubing supports as indicated on the drawings. Vertical supports shall provide for vertical adjustments without field welding.
- E. GENERAL: Support System to be designed to allow adjustments to accommodate restrictive field conditions. Design shall permit complete installation without field welding.
- F. SEISMIC BRACING: Medical system shall be adequately braced to meet all code requirements.
- G. LOADING: The support structure shall be designed to support a concentrated load of 1000 pounds, at any single point along the exposed rails. The concentrated load shall be the maximum that will be encountered by positioning the equipment at the extremities of its travel (maximal load configuration).
- H. SAFETY FACTOR: The system shall be designed with a minimum safety factor of 2.5 based upon ultimate strength under static loading conditions.

## **PART 3 – EXECUTION**

### **3.1 EXAMINATION**

- A. The installer shall inspect the work area prior to installation. If work area conditions are unsatisfactory, installation shall not proceed until satisfactory corrections are completed.

### **3.2 INSTALLATION**

- A. Installer's qualifications - Due to the potential need to make last minute changes to accommodate field conditions, the Contractor must be specifically trained in the design and installation of medical equipment supports.
- B. Set Strut System components into final position true, level, and plumb, in accordance with approved shop drawings.
- C. Anchor material firmly in place. Tighten all connections to their recommended torques.

### **3.3 CLEANUP**

- A. Upon completion of this section of work, remove all protective wraps. Clean any debris due to installation of this section of work.

### **3.4 PROTECTION**

- A. During installation, it shall be the responsibility of the installer to protect this work from damage.
- B. Upon completion of this scope of work, it shall become the responsibility of the general contractor to protect this work from damage during the remainder of construction on the project and until substantial completion.

**END OF SECTION**

**SECTION 13 8500**  
**SEISMIC PROTECTION**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Seismic protection and restraints for mechanical/electrical equipment and systems.

**1.2 PERFORMANCE REQUIREMENTS FOR SEISMIC RESTRAINTS**

- A. Criteria: Provide seismic restraints for mechanical and electrical systems, components and elements in accordance with International Building Code (IBC) 2015 and ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures." Include seismic bracing, supports, and attachments.
- B. Project Conditions
  - 1. Site Class as Defined in the IBC: C
  - 2.  $S_{DS}$ , Design Spectral Acceleration at Short Periods: 0.122.
  - 3.  $S_{D1}$ , Design Spectral Acceleration at One Second Period: 0.092.
  - 4. Seismic Risk Category as Defined in the IBC: III
  - 5. Component Importance Factor  $I_p$ : determine in accordance with ASCE 7 for each component.
- C. Design: Design seismic restraints in accordance with stated criteria. Design and detailed drawings shall be by a Registered Professional Engineer.
- D. Exclusion: Install seismic protection of water pipes for fire protection systems as specified in Section 21 1000.
- E. Exclusion: Install seismic protection of ceilings as specified in section 09 5000.

**1.3 SUBMITTALS**

- A. Product Data: Submit details including materials, configuration and fastenings for manufactured seismic restraint devices. Submit test data approved by ICBO confirming load capacity.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include the following:
  - 1. Seismic-Restraint Details: Detail fabrication, arrangement, locations, spacing and attachment of seismic restraints and snubbers. Show anchorage details.
- C. Design Analysis for Seismic Restraints: Submit complete calculations for seismic restraints, stamped by a Registered Professional Engineer.

- D. Component Certification: When ASCE 7 requires Component Certification for any particular component, submit manufacturer's certificate of compliance indicating that the component complies with ASCE 7 requirements.

## **PART 2 - PRODUCTS**

### **2.1 SEISMIC RESTRAINTS**

- A. Provide seismic restraints of type permitted by IBC and ASCE 7 and in accordance with the Contractor have approved design.

## **PART 3 - EXECUTION**

### **3.1 SEISMIC RESTRAINT INSTALLATION**

- A. Install seismic restraints in accordance with IBC, ASCE 7 and Contractor's approved design.

**END OF SECTION**