SECTION 05100
STRUCTURAL METAL (Site)

The provisions of the Standard Specifications for Public Works Construction (SSPWC) latest Edition apply except as modified herein.

PART 1 – GENERAL

1.1 Related Work Specified Elsewhere:

a. Concrete Reinforcement: Section 03200.
b. Masonry Reinforcement: Section 04200.

1.2 Work Furnished but Installed by Others:

Furnish connections and connectors necessary for the completion of the work of other sections of these specifications.

1.3 Quality Assurance:

a. Material quality standards and testing procedures shall be in accordance with the American Society for Testing Materials, hereinafter referred to as ASTM. All ASTM standards and testing procedures shall be the latest requirements.

b. All fabrication and erection of steel work shall be in conformance with the requirements of the American Institute of Steel Construction (AISC).

c. All welding and built-up welded members shall conform to the requirements of the American Welding Society (AWS).

1.4 Tests and Inspections: See Section 01410.

a. Tests and Inspections shall be made by a testing laboratory approved by the Structural Engineer.

b. The cost of sampling and testing shall be borne by the Agency.

c. One tension and one bend test shall be made for each size and shape of steel designated in the Test and Inspection Request Form.

d. Prepare and distribute test reports as required by Section 01410.

e. Additional tests of material shall be made when, and as directed by the Structural Engineer. Cost of these tests shall be borne by the Agency.

f. Inspection of welding designated on the Test and Inspection Request Form shall be made by an Inspector approved by the Structural Engineer who shall certify that the welding is in compliance with these drawings and specifications. The Contractor shall provide access to the work for inspection purposes, and shall notify the Inspector when work is to be performed. The cost of this inspection shall be borne by Agency.

1.5 Submittals:

a. Submit shop drawings of work specified herein as required under Section 01340.

b. Fabrication and/or erection prior to receipt of Structural Engineer's approval is at

Contractor's sole risk. All shop and fabrication drawings shall be referenced to the applicable sections or details on the Contract Drawings. Shop drawings not so referenced will be rejected.

PART 2 – PRODUCTS

2.1 Materials:

a. All structural steel shall conform to the latest ASTM A36.

b. Pipe columns shall conform to ASTM A53, Grade B pipe.

c. Rectangular steel tubing shall conform to ASTM A501 and shall have a yield strength no less than 35 KSI.

d. All bolts shall conform to ASTM A307.

2.2 Fabrication and Manufacture:

a. All steel shall be fabricated in accordance with Specifications of the AISC. All workmanship shall be done in a first-class manner.

b. All welding shall be done by the shielded arc method. All welders shall be properly qualified. Surplus metal shall be dressed off to smooth, even surfaces where welds are exposed to view. All welding electrodes shall conform to AWS E70XX.

2.3 Painting:

a. Steel work does not require shop painting.

PART 3 – EXECUTION

3.1 Erection:

a. Erection shall be in accordance with first class practices, members level, properly aligned and columns plumbed. The Contractor shall provide erection bracing of the steel work to ensure the safety and security of the structure in accordance with California State Safety Codes.

END OF SECTION - 05100

SECTION 05120

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Provide structural steel and accessories as shown on the Drawings, specified herein, and needed for a complete and proper installation.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary conditions, and Sections in Division 1 of these Specifications.
2. Section 01410: Testing and Laboratory Services.

C. Codes: Materials and work shall conform to the governing Building Code. In case of conflict between these specifications, the standard specifications, and the Building Code, the more stringent shall govern.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

B. Product data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
1. Sufficient technical data to demonstrate compliance with the specified requirements;
2. Complete Shop Drawings showing all members, proposed cuts, connections, camber, holes, and similar data.
3. Manufacturer's Mill Certification.
4. Mill Test Report.
5. Welders Certification.
6. Fabricators and Erectors Qualifications.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Perform welding with electric arc process and in accordance with AWS "Code for Arc and Gas Welding in Building Construction".

C. In addition to complying with pertinent codes and regulations, comply with:
1. AISC "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings";
2. AISC "Code of Standard Practice";
3. AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Section 01600.

B. Delivery and storage:
1. Delivery materials to the job site properly marked to identify the location for which they are intended.
2. Use markings corresponding to markings shown on the approved Shop Drawings.
3. Store in a manner to maintain identification and prevent damage, off the ground, using pallets or other supports, and to permit easy access for inspection.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide the following where called for on the Drawings or otherwise required.
1. Rolled steel, plates and bars: Comply with ASTM A572 grade 50 or A-992 (Fy = 50 ksi).
2. Steel pipe: Comply with ASTM A53, type E or S, grade B.
3. Steel tube: ASTM A500, Grade B.
4. Machine bolts: Comply with ASTM A307, grade A, and ANSI B18.2, with square and/or hexagonal heads as selected by the Contractor.
5. High Strength Bolts: ASTM A325 Slip-Critical, tension set high strength bolts.
6. Bolts embedded in concrete, ASTM 1554 Grade 55.
7. Arc welding electrodes: Comply with ASTM A233, E70XX series, as required for conditions of intended use.
8. Primer: Use "1099 Tnemec Primer" or "Rustoleum Number 5769 Primer".

2.02 FABRICATION

A. Shop fabrication and assembly:
1. Fabricate items of structural steel in accordance with AISC specifications and as shown on the approved Shop Drawings.
2. Where finishing is required, complete the assembly, including welding of units, before start of finishing.
3. Provide finish surfaces of members exposed in the final structure free from markings, burrs, and other defects.

B. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

C. Do not flame cut holes or enlarge holes by burning.

2.03 SHOP PAINTING

A. General:
1. Thoroughly clean structural steel, removing all loose mill scale, grease, dirt, and foreign matter by scraping or sandblasting.
2. Apply the specified paint to a dry film thickness not less than 1.5 mils.

B. Do not paint:
   1. Steel scheduled to be covered by sprayed-on fireproofing or scheduled to be in contact with concrete.

2.04 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 ERECTION

A. Surveys:
   1. Establish permanent benchmarks necessary for accurate erection of structural steel.
   2. Check elevations of concrete surfaces, and locations of anchor bolts and similar items, before erection proceeds.

B. Temporary shoring and bracing:
   1. Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads.
   2. Provide temporary guy lines to achieve proper alignment of the structure as erection proceeds.
   3. Remove temporary connections and members when permanent members are in place and final connections are made.

C. Anchor bolts:
   1. Install anchor bolts and other connectors required for securing structural steel to adjacent work.
   2. Provide templates and other devices as needed for presetting bolts and other anchors to accurate locations.

D. Field assembly:
   Structural steel shall not be erected until after the 7-day tests on concrete slab/foundations have been approved.
   1. Set structural members accurately to the lines and elevations indicated.
   2. Align and adjust the members forming part of a complete frame or structure before fastening permanently.
   3. Clean the bearing surfaces and other surfaces which will be in permanent contact before assembly.
   4. Adjust as required to compensate for discrepancies in elevation and alignment.
   5. Level and plumb individual members of the structure within specified AISC tolerances.

6. Establish required leveling and plumbing measurements on the mean operating temperature of the structure, making allowances for the difference between temperature at time of erection and the mean temperature at which the structure will be when completed and in service.
7. Comply with AISC specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to welds.

E. Gas cutting:
1. Do not use gas cutting torches for correcting fabricating errors in structural framing.
2. If gas cutting is permitted by the Engineer for secondary members, finish the gas cut section to a sheared appearance acceptable to the Architect.

3.03 PAINTING

A. Secure all required approvals of welding and connections prior to application of field primer.

B. Notify the Architect when the work of this Section is ready to receive primer.

C. Prime coat structural steel and fittings, except galvanized items, which will not be enclosed or concealed in the finished work.
1. Prepare surfaces by removing loose rust, loose mill scale, and spatter, slag, and flux deposits.
2. Clean steel in accordance with Steel Structures Painting Council SP-3, "Power Tool Cleaning".
3. After erection, clean spots and surfaces where paint has been removed, damaged, or burned off, and clean field bolts and other field connections not concealed in the finished Work.
4. Remove dirt, oil, and grease.
5. Apply a spot coat of the approved primer.
6. Do not apply paint to wet, damp, oily, or improperly prepared surfaces.
7. Spray apply the primer, filling joints and corners, and covering surfaces with a smooth unbroken film of at least 1.5 dry mils thickness.

END OF SECTION - 05120

SECTION 05120
STRUCTURAL STEEL (Site)

The provisions of the Standard Specifications for Public Works Construction (SSPWC) latest Edition apply except as modified herein.

PART 1 – GENERAL

1.1 Scope:

a. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified, and as necessary to complete the Contract, including but not limited to these major items:

b. All structural steel framing, including plates and channels;

c. Furnishing of anchor bolts.

1.2 Related Work Specified Elsewhere:

a. Miscellaneous metal work;
b. Setting of anchor bolts.

1.3 General Requirements:

a. Field Conditions. Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces.

b. Codes. Materials and work shall conform to the governing Building Code. In case of conflict between these specifications and the Building Code, the more stringent shall govern.

c. Notes. General Notes on the drawings are part of this section.

d. Shop Drawings. Prepare and submit for review six (6) sets of complete checked shop drawings as required for this work.

e. Improper Correction: Should the Landscape Architect, in reviewing shop drawings, make corrections that would cause incorrect fittings or reduced strength, give written notice of such fact at once, so that the correction may be modified before the work affected is started.

f. As-Built Drawings. After this work has been erected, correct or revise the originals of the approved shop drawings and erection diagrams to correspond with field changes.

g. Tests and Inspections. The County will pay for all tests and inspections of completed installation of this work. Costs of all tests and inspections at materials sources and costs or retests of rejected work shall be borne by the Contractor. Arranging for and scheduling of tests and inspections are responsibilities of the Contractor.

PART 2 – MATERIAL

2.1 Materials:

New tested stock of domestic manufacture complying with standard specifications hereinafter referenced. If foreign material is used, it shall meet or exceed the requirements of all authorities having jurisdiction.

2.2 Structural Steel:

Conform to ASTM A36.

2.3 Machine Bolts:

Conform to ASTM A307, Grade A and ANS B18.2, square or hexagonal heads at Contractor's option.

2.4 Arc-Welding Electrodes:

Conform to requirements of AWS; as required for the conditions of intended use. Use E70XX electrodes.

2.5 Steel Tubes:

Conform to ASTM A501.

2.6 Paint:

Themec #99 Red Metal Primer; Rust-Oleum X60 Red Bare Metal Primer of #960 Zinc Chromate; or SR-50 (Spray) or SR-51 (Brush) Steel Cote Universal Primer.

2.7 Test:

a. Identified Material: If material is properly identified, mill report will be accepted.

b. Unidentified Material: One tension and bend test for every 5 tons or fractional part thereof. Copies of all test reports shall be submitted to the Landscape Architect a reasonable time before starting fabrication.

2.8 Tests of Welding and Bolting:

Testing agency shall inspect all shop and field welding and furnish qualified Deputy Inspectors approved by the Landscape Architect and registered with the Building Department under which the project is constructed. Testing and inspection shall comply with all regulations of the Building Department having jurisdiction. Testing agency shall certify in writing upon completion of the work that the welding has been performed by fully qualified welders in accordance with drawing and specification requirements and with all applicable requirements of regulatory agencies having jurisdiction.

PART 3 – EXECUTION

3.1 Painting:

Thoroughly clean structural steel of loose mill scale, grease, dirt and foreign matter by thoroughly scraping, wire brushing or sandblasting, and give surfaces an application of paint to a dry film thickness of one mil.

3.2 Field Measurements:

Before starting work, obtain field measurements pertaining to or affecting this work, and verify the locations and exact positions of concrete and anchor bolts occurring therein.

3.3 Workmanship:

a. Workmanship. Equal to the best standard practices in modern structural shops and conforming to applicable provisions contained in the AISC Code of Standard Practice, except where these requirements govern.

b. Injury and Excessive Stress. Transport, handle and erect structural steel in shop and field to preclude injury. In no case shall it be subject to excessive stress in any part or connection.

3.4 Fabrication and Assembly:

a. Before being fabricated or worked, material shall be thoroughly wire brushed, cleaned of loose mill scale and rust, and straightened by methods that will not injure it. After punching or working the component parts of a member, remove twists or bends before the parts are assembled. Finished members shall be free from twists, bends, and open joints when erected.

b. Field Joining. Members and sections shall be of sizes, weights, shapes, and arrangements indicated, closely fitted, and finished true to line and in precise position necessary to allow accurate erection and proper joining of parts in the field. Drifting to enlarge unfair holes will not be allowed. Rolled sections, except for minor details, shall not be heated without prior approval.

c. Contact. Component parts of built-up members shall be well pinned and rigidly maintained in close contact using clamps or temporary bolting during welding. Compression joints depending upon contact bearing shall have bearing surfaces accurately milled perpendicular to their axes, or as detailed.

3.5 Gas Cutting:

Use of a cutting torch is allowed where the metal being cut is not carrying stress during the operation, and provided stresses will not be transmitted through a flame-cut surface. Make gas cuts smooth and regular in contour. To determine the effective width of members so cut, deduct 1/8 inch from the width of the gas cut edges. Make the radius or re-entrant gas cut fillets as large as practicable, but in no case less than one inch. Grind smooth and paint.

3.6 Punching, Drilling and Reaming:

Material may be punched 1/16 inch larger than the nominal diameter of the bolt, wherever the thickness of the metal is equal to or less than the diameter of the bolt plus 1/8 inch. Where the metal is thicker than the diameter of the bolt plus 1/8 inch, holes shall be drilled or sub-punched or reamed. The diameter for sub-punched holes and the drill for sub-drilled holes shall be 1/16 inch smaller than the nominal diameter of the bolt to be accommodated. Precisely locate finished holes to insure passage of bolts through assembled materials without drifting. Enlarge holes, where necessary, to receive bolts by reaming. Poor matching of holes is sufficient cause for rejection.

3.7 Welding:

Welding and welded joints. Detail and execute in accordance with the requirements of the American Welding Society standards and as modified by AISC Specifications or as detailed and noted on the drawings. In the event of conflict, the notes and details on the

drawings shall take precedence. Structural welding shall be done by Innershield or Submerged arc.

3.8 Erection:

a. Erect structural steel by professional riggers, carefully planned and laid out so that a minimum of cutting will be necessary. Erect the work plumb, square and true to line and level, and in precise positions as indicated. Provide temporary bracing and guys wherever necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation, and leave in place as long as necessary to safeguard all parts of the work.

b. Temporary Connections. As erection progresses, the work shall be securely bolted up as necessary to maintain the steel in proper position while field bolting and welding is being done, and as necessary to take care of dead loads, wind and erection stresses. No field welding or high strength bolting shall be done until the work has been properly aligned, plumbed and leveled.

c. Sequence. Carry out the erection of structural steel in proper sequence with the work of other trades. Frame, bed, and anchor to the concrete and related work in strict accordance with the detailed drawings and approved setting diagrams.

d. Erection Tolerance. In accordance with the latest AISC Code of Standard Practice of Steel Buildings and Bridges.

3.9 Anchor Bolts:

Furnish to the site when and as required to maintain job progress, for installation under Concrete or Masonry Section, all anchor bolts to be embedded in the concrete or masonry for the securing of structural steel in proper position. Provide the necessary drawings and templates for the setting of such anchor bolts in the concrete forms. Be jointly responsible with others for the proper location and installation, and make good deficiencies and errors. Setting of anchor bolts in hardened concrete, necessitated through error or oversight, shall be made under direction of the Architect.

3.10 Grouting of Plates:

Be responsible for maintaining bearing plates in proper location and in proper level while they are being grouted and be jointly responsible for a perfect job. Refer to Concrete Section for materials, mix and procedures for grouting of plates.

3.11 Cutting Structural Steel:

Provide cuts in structural steel for mechanical, plumbing and electrical pipes as approved by Landscape Architect. Locate as shown on Mechanical, Plumbing and Electrical drawings. Grind smooth and paint.

END OF SECTION - 05120