SECTION 32 31 13
CHAIN LINK FENCES AND GATES

PART 1 – GENERAL

1.01 SUMMARY

A. The work covered by this section consists of furnishing and erecting site chain link fences and gates of all types shown on the drawings and at locations as shown on the drawings in accordance with these specifications and in conformity with any details shown on the drawings. Fencing shall include but not be limited to detention ponds, retaining walls, perimeter or security fencing.

1.02 REFERENCED STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO) – latest edition
   1. M181 – Standard Specification for Chain Link Fence
B. American Society for Testing and Materials (ASTM) – latest edition
   1. A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   2. A 641 – Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
C. MILITARY SPECIFICATION
   1. MIL-P-26915 – Primer Coating, Zinc Dust Pigmented for Steel Surfaces
D. FEDERAL SPECIFICATION
   1. TT-P-641 – Primer Coating, Zinc Dust – Zinc Oxide (Galvanized Surfaces)

PART 2 – PRODUCTS

2.01 FRAMEWORK, METAL POSTS, AND RAILS

A. The Contractor shall furnish galvanized steel fence framework, unless otherwise specified on the drawings.
B. Galvanized fence fabric shall be utilized with framework, unless otherwise specified on the drawings. The Contractor shall furnish the following galvanized steel framework system:
   1. Line Posts: 1.90 inch O.D. Steel Pipe
   2. Terminal Posts (End, Corner, or Brace Posts): 2.375 inches O.D. Steel Pipe
   3. Gate Posts, Double Gate: 2.875 inch O.D. Steel Pipe
   4. Gate Posts, Single Gate: 4.00 inch O.D. Steel Pipe
   5. Brace Rail, Top Rail and Bottom Rail: 1.66 inch O.D. Steel Pipe
C. Posts shall meet the requirements of AASHTO M181 except as otherwise provided by this specification. A 5% maximum weight tolerance will be allowed for all post and rails.
   1. Posts shall be pipe posts meeting the requirements of AASHTO M181;and,
   2. Brace rails shall be furnished with suitable metal connections to fasten them securely to the posts. The top rail shall be provided with expansion sleeves and couplings not less than 7 inches long and shall be furnished in minimum lengths of 15 feet. The complete top rail assembly shall form a continuous rail passing through the top fittings of the line posts and shall be furnished with suitable metal connections to fasten it to the posts at each end. A bottom rail is required, and may break between posts, with fittings as necessary to connect the bottom rail to the post on each side.

2.02 WIRE GAGE

A. Whenever the term “gage” is used in this section to refer to a size of wire, it shall mean the United States Steel Wire Gage regardless of whether or not the base metal of the wire is steel or a nonferrous metal.

2.03 FABRIC

A. Chain link fence fabrics shall meet the requirements of AASHTO M181. Galvanized steel fabric shall have a Class 2 zinc coating.

B. The height of the chain link fence fabrics shall be shown on the drawings. The fabric shall be woven from 9 gage wire with a 2 inch mesh size, and both top and bottom selvage's knuckled, unless otherwise indicated on the drawings.

2.04 FITTINGS AND ACCESSORIES

A. All fittings and accessories to be used with the fencing shall meet the requirements of AASHTO M181 except for the coating which shall be as stated below.
   1. All hardware and fittings shall be hot dip galvanized so as to have a minimum coating of 1.80 ozs. per square foot of actual surface except that any item under 1/8 inch in thickness shall have a minimum coating of 1.50 ozs. per square foot of actual surface. Bolts, nuts, washers, and other threaded items shall be galvanized in accordance with ASTM A153.
      a. Swing Gate Hardware
         1) Hinges shall be of size and material to suit gate size, non-lift-off type, offset to permit full 180 degree gate opening. Provide a pair of 1½ inch hinges for each leaf over 6 feet in nominal height.
         2) Latch shall be forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
      b. Double Gate Hardware
         1) Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using 1 padlock for locking both gates.
      c. Sliding Gate Hardware
         1) Provide manufacture's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and supports, guides stays, bracing, and accessories as required.
   2. Where shown on the drawings, the posts shall be fitted with ornamental tops. The base of tops to be used with pipe posts shall fit over the top of the post to guard against moisture.
   3. Tie wires for fastening chain link fabric and tension wire to tubular sections shall be 9 gage galvanized steel. Hog rings used to fasten chain link fabric to tension wire shall be 11 gage galvanized steel. The galvanized wires and hog rings shall have a Class 3 coating in accordance with ASTM A641, except that a minimum coating of .60 ounces will be allowed for wires 9 gage and heavier and a minimum coating of .50 ounces per square foot for 11 gage wire.
   4. Tension wire for use with galvanized steel chain link fabric shall meet the requirements of AASHTO M181 for zinc coated tension wire.

2.05 CONCRETE

A. All concrete shall have a 28 day compressive strength of 3000 psi, with a slump range of 1 to 3 inches at time of placement and with 4% to 8% air entrainment. In lieu of ready mix concrete, pre-mixed commercially bagged dry concrete mix may be used provided the concrete meets the minimum strength requirements as noted above when mixed with the quantity of water shown on the instructions printed on the bag.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All posts shall be aligned, set and maintained in a vertical position with line posts spaced at 10 feet intervals o.c. maximum.

B. Excavate hole to depths not less than 3 feet below finished grade and to minimum diameter not less than 4 times the largest cross section.

C. Posts shall be centered and placed 3 inches above bottom of hole.

D. Vibrate or tamp concrete around post. Place concrete 2 inches above finished grade, trowel to a smooth finish and slope away from post.

E. Where rock or concrete pavement or slabs occur within the required depths to which fence posts shall be erected, a hole of a diameter slightly larger than the largest dimension of the post shall be drilled in the rock or concrete and the post grouted in. The post may be shortened as necessary, provided the post is embedded within the rock or concrete pavement or slab for a minimum depth of 12 inches.

F. Where fences are required at retaining walls or reinforced slopes, post shall be installed according to the segmental retaining wall or reinforced slope manufacture's recommendations and as shown on the wall design drawings. If no recommendations are provided, the post shall be driven following construction or forms for post set during construction. Drilled excavation into the reinforced zone shall not be permitted, unless approved by the geosynthetic manufacturer, wall design engineer and the Owner.

G. Where extra length posts are needed, the posts shall not be fabricated by welding short sections of posts together to provide a longer post.

H. The fabric may either be fastened to the tension wire using 11 gage galvanized hog rings spaced at 24 inch intervals, or the tension wire may be woven through the fabric. Hog ring ties shall be made at fabric joints with the hog ring passing completely around the fabric joint.

I. Chain link fabric shall be attached to tubular end, gate, corner, or brace posts with stretched bars at 4 inch intervals o.c. and stretcher bar bans at 15 inch intervals o.c. The fabric shall be fastened to line posts with wire fasteners spaced at 12 inch intervals o.c. and wound at least 2 full turns. The fabric shall be fastened to rails and to top, bottom, and brace rails with wire fasteners spaced at 24 inch intervals o.c. and wound at least 2 full turns.

J. Chain link fabric shall be placed by securing or fastening on end and applying sufficient tension to remove all slack before making permanent attachments elsewhere. The tension for stretching shall be applied by mechanical fence stretchers designed for this purpose.

K. The Contractor will be permitted to connect rolls and pieces of chain link fabric to each other by field weaving provided that such weaving is identical in appearance and strength with the machine weaving done at the factory.

L. Leave approximately 2 inches between finished grade and bottom selvage and bottom rail. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

M. Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Knock down threads or tack weld to prevent removal of nuts.

N. Gates shall be plumb, level, and secure for full opening without interference. Anchor ground-set items in concrete. Adjust hardware for smooth operation and lubrication.

3.02 REPAIR OF GALVANIZING

A. Galvanized surfaces that are abraded or damaged at any time after the application of zinc coating shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 coats of zinc rich paint. Zinc rich paint shall meet the requirements of Military Specification Mil-P-26915(USAF) for Type 1, or of Federal Specification TT-P-641, and shall be thoroughly mixed prior to application. Zinc rich paint shall not be tinted and shall be applied 3 to 4 wet mils per coat. The total thickness of the 2 coats shall not be less than 3 dry mils. In lieu of repairing by painting with zinc rich paint, other methods of repairing galvanized surfaces that are abraded or damaged may be used provided the proposed method is acceptable to the Owner.

B. Excessive damage to galvanized surfaces as determined by the Owner shall be cause for rejection. Rejected galvanized material shall be replaced at no cost to the Owner.

END OF SECTION