

SECTION 02444**CHAIN LINK FENCE AND GATES****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes furnishing and installing new chain link fencing, gates and accessories and restoring existing fencing at the locations shown on the Contract Drawings.. The Work includes, but is not limited to, transporting materials, clearing, excavating, disposing of unused excavated material, furnishing and installing fencing, gates and accessories, backfilling, furnishing additional material for backfilling and restoring both paved and unpaved areas.

1.02 RELATED SECTIONS

- A. Section 01300 – Submittals
- B. Section 03302 – Miscellaneous Cast-In-Place Concrete

1.03 CODES AND STANDARDS

- A. American Society for Testing and Materials International (ASTM):
 - 1. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - 2. ASTM A121 – Standard Specification of Metallic-Coated Carbon Steel Barbed Wire
 - 3. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 4. ASTM A392 – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
 - 5. ASTM A572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
 - 6. ASTM F567 – Standard Practice for Installation of Chain-Link Fence
 - 7. ASTM F626 – Standard Specification for Fence Fittings
- B. Chain Link Fences Manufacturer’s Institute – Product Manual
- C. Federal Specification Sheet RR-F-191/3E Fencing, Wire and Posts, Metal (Chain Link Fence Posts, Top Rails and Braces)

D. American Association of State Highway Transportation Officials (AASHTO) M181

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 – Submittals:

1. Manufacturer's literature and/or Shop Drawings for the materials of this Section for approval.
2. The name and qualifications of the fence and gate installer(s).
3. Evidence that the fence and gate manufacturer(s) have approved the installer(s).
4. Submit a sample of each component, fastener, post, rail, support, chain link fabric, noise attenuation curtain, privacy slats, and other items, labeled as to the use and location in the Work.
5. Submit samples approximately six (6) inches long and six (6) inches square of all chain link fence fabric materials including framework members and typical accessories. Authority's review will be for workmanship only. Compliance with all other requirements is the responsibility of Contractor.
6. Copies of manufacturers' technical product information, specifications, standard details, certified test reports on product physical properties, and installation instructions for all fencing system components.
7. A list of hardware and accessories.

1.05 QUALITY ASSURANCE

- A. Fencing, gates and accessories shall be subject to inspection after delivery to the Site by the Authority.

1.06 QUALIFICATIONS

- A. Manufacturer(s) shall have a minimum of five (5) years of experience producing equipment as specified, and shall provide evidence of a minimum of five (5) installations in satisfactory operation.
- B. Select a single installer regularly engaged in the installation of fencing with successful experience in the erection of the type of fencing specified. Installers shall have a minimum of five (5) years of experience and shall have successfully completed a minimum of three (3) installations of similar complexity. Ensure that the installer employs only tradespeople with specific skills and experience in the erection of this type of work.

1.07 DELIVERY, STORAGE, AND HANDLING**A. Delivery and Acceptance Requirements:**

1. The shipping list for the materials furnished shall be endorsed with the manufacturer's voucher certifying that the materials used comply with this Section.
2. Deliver materials in manufacturer's original, unopened packaging with tags, labels, and other identifying information intact and legible.

B. Storage and Handling Requirements:

1. Store materials under weatherproof cover, off the ground, and away from other construction activities. Do not store material in a manner that would create a humidity chamber. Provide for free movement of air under protective cover and between components of the fence system.
2. Handle material in a manner that is in compliance with product institute standards and that will prevent damaging coatings.

1.08 PROJECT/SITE CONDITIONS (NOT USED)**1.09 DEFINITIONS (NOT USED)****1.10 TOLERANCE (NOT USED)****PART 2 PRODUCTS****2.01 GENERAL**

- A. Materials shall be new and products of a recognized, reputable manufacturer. Used, rerolled or re-galvanized materials will not be accepted. Materials shall be hot dip galvanized after fabrication. Posts and other appurtenances shall have a minimum zinc coating of 2.0 ounces per square foot of surface.

2.02 FABRIC

- A. Chain link fence fabric for installation of new fence shall be woven of No. 9-gauge wire in 2-inch diamond-mesh pattern, selvages twisted and barbed, galvanized after weaving with 2.0-ounce zinc coating meeting the requirements of ASTM A392, Class 2.

2.03 POSTS

- A. Supply materials in accordance with Federal Specification RR-F-191 for fence, posts, gates and accessories, except as hereinafter modified. Standard lengths or longer may be required for setting in ground or in concrete for conditions shown.

2.04 LINE POSTS

- A. For fences up to eight (8) feet high, use galvanized H-columns, 2-inch by 2-1/4 inch, weight 4.1 pounds per linear foot; or 2-1/2-inch outside diameter, ASTM A53, Steel pipe, weight 3.65 pounds per linear foot; or C-section roll formed from steel meeting the requirements of ASTM A570, Grade 45, 1.875 inches by 1.625 inches.

2.05 END, CORNER, ANGLE AND PULL POSTS

- A. For end, corner, angle and pull posts, use 2.875-inch outside diameter, standard weight steel pipe, weight 5.79 pounds per liner foot; or 3.5-inch by 3.5-inch roll-formed section with minimum bending strength of 486 pounds under a six (6)-foot cantilever load.

2.06 GATE POSTS

- A. For single swing gates up to six (6) feet wide, use 2.875-inch outside diameter, standard weight steel pipe 5.79 pounds per foot. For single gate six (6) feet wide to 13 feet wide, 4-inch outside diameter, standard weight steel pipe 9.1 pounds per foot. For other sizes, follow manufacturer's recommendations.

2.07 POST TOPS

- A. Post tops shall be pressed steel, or malleable iron, designed as a weather tight closure cap for tubular posts. Provide on cap for each post. Where top rail is used, provide to permit passage of top rail.

2.08 TENSION WIRE

- A. Tension wire shall be zinc or aluminum coated coil spring steel wire not less than No. 7 gauge (0.177 inch in diameter). Provide tie clips of manufacturer's standard as approval for attaching the wire to the fabric, at intervals not exceeding 24-inches.

2.09 STRETCHER BARS

- A. Stretcher bars shall be one-piece lengths equal to full height of fabric with a minimum cross-section of 3/16 inch by 3/4 inch. Provide one (1) stretcher bar for each gate and end post and two (2) for each corner and pull post.

2.10 STRETCHER BAR BANDS

- A. Bar bands shall be heavy-pressed steel, spaced not over 15-inches on center to secure stretcher bars to tubular end, corner, pull and gateposts.

2.11 TOP RAIL

- A. Not less than 18-foot long tubular steel, 1 5/8-inch outside diameter, weight 2.27 pounds per linear foot. Couplings to be outside-sleeve type and at least six (6)-inches long. Provide springs at one (1) coupling in five (5) to permit expansion in rail as recommended by the Manufacturer. Top rail to extend through line post tops to form continuous brace form end-to-end of each stretch of fence.

2.12 BRACES

- A. Brace pipe shall be of the same material as the top rail and shall be installed midway between the top rail and extend from the terminal post to the first adjacent line post. Braces shall be securely fastened to the posts by heavy-pressed steel and malleable fittings, then securely trussed from line post to base of terminal post with a 3/8-inch truss rod and tightener.

2.13 FITTINGS

- A. Malleable steel, cast iron, or pressed steel, galvanized to meet the requirements of ASTM A153. Fittings to include extension arms for barbed wire, stretcher bars and clamps, clips, tension rods, brace rods, hardware, fabric bands and fastenings, and accessories.

2.14 GATES

- A. Gates shall be swing, complete with latches, stops, keepers and hinges.
- B. Gate frames shall be constructed of tubular members welded at corners or assembled with fittings. On steel, welds shall be painted with zinc-based paint. Where corner fittings are used, gates shall have truss rods of 3/8-inch minimum nominal diameter to prevent sag or twist. Gate leaves shall have vertical intermediate bracing as required spaced so that no members are more than eight (8) feet apart. Gate leaves 10 feet or over shall have horizontal brace or one 3/8-inch minimum diagonal truss rod.
- C. Fabricate frames of standard weight pipe 1.90-inch outside diameter, weight 2.72 pounds per linear foot.
- D. Gate fabric shall be the same type as used in the fence construction. The fabric shall be attached securely to the gate frame at intervals not exceeding 15-inches.
- E. Gate hinges shall be of adequate strength for gate and wire large bearing surface for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.
- F. Existing fence posts may be reused as line posts or gate posts at locations where new gates are to be installed per the Contract Drawings, provided the posts are in good

condition, properly aligned and structurally adequate to support the intended loads. Remove existing fence as needed for the installation of new gates.

- G. Gate latches, stops, and keepers shall be provided for gates. Latches shall have a plunger-bar arranged to engage the center stop, except that for single gates of openings less than 10 feet wide a forked latch may be provided. Latches shall be arranged for locking with padlocks. Center stops shall consist of device arranged to be set in concrete and to engage a plunger-bar the latch of double gates. No stop is required for single gates. Keepers shall consist of a mechanical device for securing the free end of the gate when in the full open position.
- H. Double gates shall be provided in the size and configuration as indicated. Provide gate stops for double gates, consisting of mushroom type or flush plate with anchors. Set in concrete to engage the center drop rod or plunger bar. Provide locking devices and padlock eyes as an integral part of the latch, requiring one padlock for locking both gate leaves.
- I. Provide keeper for vehicle gates, which automatically engages the gate leaf and hold it in the open position until manually released.

2.15 CONCRETE

- A. Materials specified in Section 03302 – Miscellaneous Cast-In-Place Concrete.

2.16 SOURCE QUALITY CONTROL

- A. Provide fencing and gate systems as a complete system with gates, hardware, appurtenances, and other components produced by a single manufacturer, including custom erection accessories, fittings, clamps, and fastenings as may be necessary or required.
- B. Provide fence fabric imprinted with the manufacturer's trade name, country of origin, core wire gauge, and finished outside diameter gauge. Material delivered to the Project Site lacking this information will be rejected for use in the Work and shall be immediately removed even if it is discovered that the information is lacking after the material has been incorporated into the Work, at no additional cost to the Authority.
- C. Provide shipping list for materials used, endorsed with the manufacturer's voucher certifying that the material used in the fencing system complies with the Specifications.
- D. Structural shapes of satisfactory sections and equal strengths may be substituted if approved by the Authority. Submit structural calculations stamped and sealed by a Registered Professional Engineer licensed in the Commonwealth of Massachusetts for the Authority's review and approval.

PART 3 EXECUTION**3.01 INSTALLATION**

- A. Installation of fencing shall meet the requirements of ASTM F567.
- B. Erect fencing in straight lines between angle points by skilled tradesmen experienced in this type of construction. Erection shall be in accordance with the manufacturer's recommendations and in accordance with this Section.
 - 1. Post holes shall be a minimum depth of three (3) feet below finished grade. Holes for line posts shall be nine (9)-inches in diameter.
 - 2. Holes for gate, corner and pull posts shall be 16 inches in diameter.
 - 3. Spacing for posts shall not be more than 10 feet on center and in true lines.
 - 4. Set posts plumb and to the depth of 2 feet 10-inches.
 - 5. The top rail of the fence shall be at the top of the fabric.
 - 6. Fill remainder of the hole with concrete to extend around the posts to a point of two (2)-inches above finished grade.
 - 7. The top surface shall have a crown watershed finish.
 - 8. Allow 72 hours minimum for concrete curing prior to installation of accessories. Fasten chain link fabric to end posts with stretcher bars and clamps and to line posts and top rail with wire or bands at approximately 14-inch centers and 24-inch centers, respectively.
 - 9. Brace gate posts diagonally to adjacent line posts to ensure stability.
 - 10. Hang gates and adjust hardware so that gates operate adequately from open or closed position.

3.02 RESTORATION OF EXISTING FENCE

- A. Carefully cut and store fence where chain link fence is to be temporarily removed to perform the Work. Removed materials shall be salvaged and protected for reuse where practicable. Restore existing fence in kind.
- B. Upon completion of the work at each site where temporary fencing or gates are required, remove temporary gates and restore the fence to its original condition, including reinstatement of removed fence fabric, rails and appurtenances. Restoration shall result in a uniform alignment, consistent tension and appearance matching

adjacent existing fence sections.

- C. Any materials damaged, lost or deemed unsuitable for reuse shall be replaced with new materials of like kind and quality at no additional cost to the Authority.

3.03 SPARE PARTS, TOOLS, AND SUPPLIES

- A. Furnish special tools necessary to service, disassemble, repair, and adjust the equipment.
- B. Deliver spare parts, tools, and supplies with the equipment, neatly boxed, indexed, and tagged with complete information for use and reordering.
- C. Store and safeguard spare parts and tools until completion of the Work, at which time they shall be inventoried, delivered, and placed in a location designated by the Authority.

3.04 TOUCH UP AND REPAIR WORK

- A. Remove and replace fencing which is improperly located or is not true to line, grade and plumb with tolerances as indicated, at the Contractor's expense.

3.05 PROTECTION AND MAINTENANCE

- A. Maintain fencing for the entire duration of the Contract.
- B. Repair and replace broken or bent components, at the Contractor's expense. Repair coatings damaged in the shop or during field erection by recoating with manufacturer's recommended repair compound, applied in accordance with manufacturer's directions.
- C. Protect fencing system from construction traffic and other damage until acceptance of the Work.

**** END OF SECTION ****