

## 8.0 FENCING

### 8.1 GENERAL

A galvanized chain-link fence surrounding the pump station site shall be provided as specified herein and as shown on the standard details. The fence shall be 7 feet high (minimum) with a 12-foot wide double-leaf gate.

Fencing shall be located so that:

- A. There is a 10-foot space between all pump station equipment ( control panel, pump vault, valve vault, emergency storage, emergency generator, etc) and the fence perimeter.
- B. The access gate shall be located so that service vehicles have a direct and unobstructed path to the valve vault and pump chamber. Access gate shall not be placed over a manhole.

### 8.2 MATERIAL SPECIFICATIONS

#### A. Chain Link Fabric

- 1. Chain-link fabric shall be a 2-inch mesh woven from No. 9 gauge aluminum-coated steel or aluminum-zinc alloy-coated steel conforming to ASTM A491 or A783. The fabric shall have a height of 72 inches, 20-1/2 diamond count, with the bottom selvage twisted and the top selvage knuckled. Aluminum-coated steel fabric shall be given a clear organic coating after fabrication. Aluminum-zinc alloy coating on the steel fabric shall be not less than 0.47 ounce per square foot of uncoated wire surface.

#### B. Fence Framework

- 1. General: Galvanized steel, ASTM F1083 or ASTM A123, with not less than 1.8 ounces of zinc per square foot of surface, or steel conforming to ASTM A569 externally triple-coated with hot-dip galvanizing at 1.0 ounce per square foot, chromatic conversion coating and clear acrylic polyurethane and coated internally with zinc-rich coating.
- 2. Fittings and Accessories: Unless otherwise noted, all fence fittings and accessories shall be galvanized according to ASTM A153, with zinc weights per Table I.
- 3. Gate Posts: 2.875 inches O.D. at 5.79 pounds per foot.

4. End, Corner, Angle or Pull Post: 2.375 inches O.D. at 3.65 pounds per foot.
5. Line Post and Gate Frame: 1.9 inches O.D. at 2.72 pounds per foot.
6. Top Rail: 1.66 inches O.D. at 2.27 pounds per foot.
7. Braces:
  - (a) HORIZONTAL BRACE: 1.66 inches O.D. at 2.27 pounds per foot.
  - (b) DIAGONAL BRACE: 3/8-inch diameter rod equipped with adjustable tightener

C. Fasteners

The chain-link fabric shall be securely fastened to all terminal posts by a 1/4" x 3/4" tension bars with heavy 11-gauge pressed steel bands at 14-inch maximum spacing, to line posts with 9-gauge wire clips at 14-inch maximum spacing, to the top rail with 9-gauge tie wires at 24-inch maximum spacing and to the bottom tension wire using 11-gauge galvanized hog rings at a 24-inch maximum spacing..

D. Barbed Wire and Supporting Arms

1. Barbed Wire: Barbed wire shall consist of 2 strands of 2-wire aluminum-coated steel conforming to ASTM A585-81, Type I (with barbs spaced on 5-inch centers).
2. Supporting Arms:
  - (a) One supporting arm shall be placed on each line and pull post.
  - (b) Single arm at 45 degrees with vertical, sloping to outside of fence.
  - (c) Integral with post top and designed as a weather-tight closure cap.
  - (d) Constructed for attaching 2 rows of barbed wire to each arm.
  - (e) Designed for 200 pound minimum pull-down load.
  - (f) Malleable iron or pressed steel.

E. Bottom Tension Wire:

The bottom tension wire shall be a No. 7 gauge aluminum-coated steel conforming to ASTM A824, Type I. The tension wire shall be placed at the bottom of the chain-link fabric and stretched tight with galvanized turnbuckles.

F. Post Tops:

The post tops shall be designed as a weather-tight closure cap for the tubular posts.

G. Gates:

1. Framing:

- (a) Frames shall be assembled by welding or watertight galvanized steel rigid fittings.
- (b) Provide with the same chain-link fabric as for fence. Install fabric with stretcher bars at vertical and top and bottom edges.
- (c) Provide a diagonal brace on each gate leaf to ensure frame rigidity without sag or twist.

2. Hardware:

- (a) Hinges of pressed or forged steel, or malleable iron, nonlift-off type, offset to permit 180 degree gate opening, 3 per leaf.
- (b) Plunger-bar type latch with flush-type gate stop shall be provided. Latch bar shall extend to full gate height and be designed to easily engage gate stop.
- (c) Locking device and padlock eyes shall be an integral part of the latch.
- (d) An automatically engaging gate keeper shall be provided for each gate leaf which shall secure the free end of the gate in the open position.

H. Protective Electrical Ground

Continuous fence shall be grounded at each corner post and at intervals not exceeding 500 feet, as per the Standard Details.

## I. Pump Station Sign

Each pump station shall be provided a sign in accordance with the Standard Details. The sign shall be securely fastened to the chain-link fence at a location clearly visible from the pump station access road and approved by the City.

## 8.3 INSTALLATION

### A. Fence

1. Follow general contour of ground and properly align.
2. Posts
  - (a) Set in concrete bases as indicated on Standard Details.
  - (b) Temporarily brace until concrete base has set.
  - (c) Install plumb and in straight alignment.
  - (d) Install pull posts every 300 feet if no corner posts are encountered in that distance.
  - (e) Install pull posts at changes in direction of 10 degrees to 30 degrees.
  - (f) Install corner posts at changes in direction of 30 degrees or more.
  - (g) Install pull posts at all abrupt changes in grade.
3. Post Bracing:
  - (a) Install braces for each end, pull and gate post and each side of each corner post.
  - (b) Install after concrete has set.
  - (c) Install so posts are plumb and in straight alignment when diagonal brace is under tension.
4. Tension Wire:
  - (a) Weave through the fabric and tie to each post with a

minimum 9-gauge galvanized wire.

5. Chain-Link Fabric:

- (a) Stretch taut with equal tension and each side of posts.

6. Stretcher Bars:

- (a) Install at each pull, end and gate post and on each side of corner posts.

7. Barbed Wire:

- (a) Attach 2 rows to each barbed wire supporting arm. Pull wire taut and fasten securely to each arm.
- (b) Install 2 rows above the fabric and on extended gate end members of swing gates.

8. Fasteners:

- (a) Install nuts for tension bands and hardware bolts on inside face of the fence and peen ends of bolts or score threads to prevent removal of nuts.

B. Gates

1. Install plumb and level.
2. Install all hardware, framing, supports, and appurtenances as required for gate.
3. Install keepers, ground-set items, and flush plate in concrete for anchorage as shown on Standard Details.
4. Adjust and lubricate as necessary for smooth operation.

C. Repairing Damaged Coatings

1. All damaged coatings shall be repaired in the shop or field by re-coating with compatible and similar coating as per manufacturer's recommendations.