**NOTES:**

**GENERAL:** Mount all bollard sleeves flush with the bikeway pavement.

**CONCRETE ENCASEMENT:** Sleeve encasement shall be square as shown, in concrete pavement, but may be square or round in flexible pavement. Round encasement should be 1'-0" diameter.

**PERFORMED EXPANSION JOINT FILLER:** Shall meet the provisions of CMS 705.11, and is required when bollards are set in concrete pavement.

**STEEL PIPE:** ASTM A 53 Schedule 40.

**CONCRETE:** Use Class C concrete as specified in CMS 499 and CMS 511.

**REFLECTIVE SHEETING:** Shall meet the provisions of CMS 150.19.

**GALVANIZING:** After fabricating, hot-dip galvanize all steel parts, including steel pipe, as specified in ASTM A 123.

**ALUMINUM:** All steel components may be replaced by aluminum components meeting the following ASTM Specifications: B 209 (plates), B 210 or B 241 (drawn seamless tubes & plates), B 211 (rods), and F 901 (bolts).

**REMOVABLE BOLLARDS:** Permanent Bollards shall be the same as Removable Bollards, except that the steel plates, sleeves and lifting handles shall be omitted. Encase posts directly in concrete.

**GENERAL:**

**NOTES:**

**CONCRETE ENCASEMENT:**

- Sleeve encasement shall be square as shown, in concrete pavement, but may be square or round in flexible pavement. Round encasement should be 1'-0" diameter.

**GALVANIZING:** After fabricating, hot-dip galvanize all steel parts, including steel pipe, as specified in ASTM A 123.

**REFLECTIVE SHEETING:** Shall meet the provisions of CMS 150.19.

**CONCRETE:** Use Class C concrete as specified in CMS 499 and CMS 511.

**STEEL PIPE:** ASTM A 53 Schedule 40.

**ALUMINUM:** All steel components may be replaced by aluminum components meeting the following ASTM Specifications: B 209 (plates), B 210 or B 241 (drawn seamless tubes & plates), B 211 (rods), and F 901 (bolts).

**PERMANENT BOLLARDS:** Permanent Bollards shall be the same as Removable Bollards, except that the steel plates, sleeves and lifting handles shall be omitted. Encase posts directly in concrete.

**GENERAL:**

**NOTE:** Bollards should be located outside the roadway Clear Zone.
**BOLLARD DETAIL**

- **SECTION**
  - 2 ½" x 6" x ¾" Side Plates
  - 1" Hole in the Bottom Plate
  - 8" x 12" x ¾" Bottom Plate
  - 4 - ½" dia. Steel Bar - Full Penetration Weld to Bottom Plate
  - Remove Locking Bolt to Collapse

- **PLAN**
  - ½" Hole Through Bottom Plate
  - Lock by Others
  - 3 1/2" Bolt

**DETAIL OF TIMBER**

- ½" dia. x 6" Carriage Bolt with ¾" hole for lock
- 2 - 3" x 6" Timbers
- 4½ Normal Dimensions (Actual Size 2½" x 7½"
- Smooth Cut)
- 2 ½" x 6" Side Plates with ½" holes and 2 ¼" Radius
- ½" dia. Bolt with Pin - Insert into a ¾" Metal Sleeve Drilled Out to ½"

**DETAIL OF HOLE FOR LOCK**

- Bolt Shank
- ½" Bolt
- ½" Hole

**NOTES:**

- **MATERIALS:** In order to ensure that the bollard stays plumb and in place, make the fittings as tight as possible. If made of wood, construct the bollard using CCA pressure treated Southern Yellow Pine. Pressure treat as specified in CMS 712.06. Hot-dip galvanize any hardware and steel used for the bollard.

- **PAYMENT:** Payment for the bollard shall be Item Special - Bollard, Misc., Hinged.

**NOTES:**