

# COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICE LIST



Traffic Safety Division

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\* Section R. Temporary Portable Rumble Strips Modified

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## **A. INTRODUCTION**

This list contains products that have been evaluated and determined to be acceptable traffic control devices for use in work zones. At a minimum, newly-manufactured devices on this list must be considered to be compliant with the *Manual for Assessing Safety Hardware* (MASH). Devices compliant with National Cooperative Highway Research Program (NCHRP) Report 350 are also acceptable if manufactured prior to December 31 2019, and may continued to be used throughout their useful service life.

This list is intended to supplement and clarify the *Traffic Control Standard Sheets* (TCSS) by providing the most up-to-date information available. All devices shall comply with the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD).

Dimensions given in this document are nominal and are given merely for descriptive purposes.

Inclusion on this list does not imply that these products are eligible for permanent installation on state right-of-way. This list is not exhaustive; crashworthy products exist that are not included herein. TxDOT will consider products for inclusion if sufficient information is provided to make a decision. For a product to be evaluated for inclusion on this list, all related data such as an evaluation report prepared by an independent testing agency under the supervision of a registered professional engineer, video tape of crash test (if crash tested), compliance letter from the FHWA, etc. must be sent to the TxDOT Traffic Standards Engineer. **DO NOT** send originals; the documentation submitted shall not be returned. TxDOT reserves the right to review all documentation and may or may not accept the device for inclusion on this list. The fact that FHWA considers a device to be compliant with NCHRP 350 or MASH does not obligate TxDOT to include that device on this list. TxDOT reserves the right to remove products, with sufficient cause, at any time. If a product is rejected or removed, a letter notifying of the rejection or removal and stating the specific reasons will be sent to the listed product source(s). The product source(s) may address TxDOT's concerns that caused the rejection or removal of the product and resubmit it for TxDOT's further consideration.

The devices in each category are generally listed in alphabetical order by vendor. The order is not intended to indicate a particular device preference. TxDOT does not endorse products. **This list shall not be used for product promotion.**

TxDOT recognizes that some of the items and information it needs to evaluate a device's compliance with NCHRP 350 or MASH may be proprietary and, as such a petitioner may want them to be held in confidence. Within the limits of law, TxDOT will honor written requests for confidentiality.

For information concerning this document, clarification or interpretation of items contained herein, or for further information on submitting a device for consideration, contact the Traffic Standards Engineer.

This list addresses only the crashworthiness of the devices. When maximum sign sizes or maximum number of supports are given, they shall be adhered to. It is the responsibility of the contractor to determine which support is appropriate for a given sign size, location, and soil condition. A device considered crashworthy may not be crashworthy if used or installed incorrectly. It is the contractor's responsibility to use or install the device in a manner such that it will function as intended.

The Engineer, through a General Note in the Plans, may disallow the use of specific devices on this list or require that specific devices from this list be used. A proprietary device should not be used unless: (a) the device is supplied through a competitive bidding with equally suitable unpatented items; (b) TxDOT certifies that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. The Engineer shall not require the use of a device, of the types included herein, that is not on this list.

TxDOT encourages the use of recycled products when possible. Plastic products shall be UV/color-stabilized.

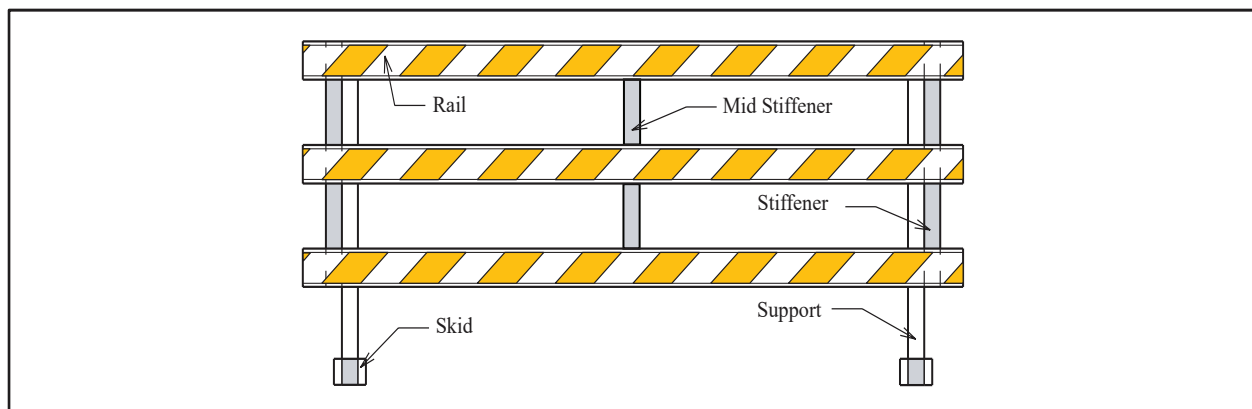
All reflective sheeting shall as a minimum meet either one of the following Departmental Material Specifications: *DMS-8300, Sign Face Materials* or *DMS-8310, Flexible Roll-up Reflective Signs*. When the sheeting used on a particular device exceeds the requirements of these specifications, all similar devices used in that area shall use equivalent sheeting (e.g., all drums should use an equivalent grade of sheeting).

## **B. DEFINITIONS**

**ASTM** - American Society for Testing and Materials. This organization publishes many specifications. They are referenced by number of the form “ASTM LXXX-Year” (e.g., ASTM C387-95) and are available from their website: [www.astm.org](http://www.astm.org).

**backfill** - soil that was originally in the hole dug for support placement that is used to refill the hole after the support is placed.

**barricade** - a portable or fixed channelizing device having from one to three rails with appropriate markings (see the *Texas Manual on Uniform Traffic Control Devices* for more details). Barricades are used to control traffic by closing, restricting, or delineating all or a portion of the roadway. The type refers to the number of rails (i.e., a Type I has one rail, a Type II has two rails, and a Type-III has three rails). See Figure B-1 for a description of barricade components.



**Figure B-1. Barricade component terminology**

**BC sheets** - *Barricade and Construction Standards* are a section of the *Traffic Control Standard Sheets* (TCSS) that are available on the internet at <http://www.txdot.gov/business/disclaim.htm>.

**concrete, premixed** - normal strength / normal weight concrete complying with *ASTM C387-95 Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete*. Most prepackaged concrete mixes comply with this specification.

**DMS** - TxDOT Departmental Material Specifications are referenced by numbers in the form “DMS-XXXX” (e.g., DMS-8310). In some older publications, the reference number may be in the form “D-9-XXXX”. These numbers are available from the TxDOT Construction Division or from the TxDOT website: [www.txdot.gov](http://www.txdot.gov).

**embedment, direct** - placed in the original soil by driving or by creating a hole and backfilling.

**FHWA** - Federal Highway Administration.

**FRP** - fiberglass reinforced plastic.

**HDPE** - high density polyethylene.

**HPPL** - hollow profile plastic lumber - hollow core plastic boards with dimensions similar to that of lumber.

**LDPE** - low density polyethylene.

**PSST** – perforated square steel tubing.

**Part 6 of the TMUTCD** - *Texas Manual on Uniform Traffic Control Devices - Part 6, Temporary Traffic Control.*

**soilcrete** - backfill stabilized by mixing with portland cement.

**SMD sheets** - *Sign Mounting Details* are a section of the *Traffic Control Standard Sheets* (TCSS) that are available on the internet at <http://www.txdot.gov/business/disclaim.htm>.

**substrate** - component of the sign to which the retroreflective sheeting is affixed.

**SYP, No. 2** - No. 2 southern yellow pine. Different species and grades with similar structural properties may be used. For purposes of this list, these equivalent species/grades are:

- ♦ No. 2 Southern Pine.
- ♦ No. 2 Douglas Fir.
- ♦ No. 1 Western Hemlock.
- ♦ No. 2 Ponderosa Pine.
- ♦ No. 2 Red Pine.
- ♦ No. 1 Western Red Cedar.

**SPL** - solid plastic lumber.

**TCSS** - *Traffic Control Standard Sheets* are available on the internet at <http://www.txdot.gov/business/disclaim.htm>.

**TMUTCD** - *Texas Manual on Uniform Traffic Control Devices* available on the internet at [http://www.txdot.gov/txdot\\_library/publications/tmutcd.htm](http://www.txdot.gov/txdot_library/publications/tmutcd.htm).

**TRF** – TxDOT Traffic Safety Division.

**TxDOT** - Texas Department of Transportation.

**UV/color-stabilized** - denotes a plastic which has chemicals added during the manufacturing process that significantly reduces plastic degradation and color fading caused from exposure to ultraviolet light (i.e., sunlight).

**work, duration of** - There are five categories for duration of work:

- ♦ **long-term** - work that occupies a location more than 3 days.
- ♦ **intermediate-term** - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour.
- ♦ **short-term** - daytime work that occupies a location for more than 1 hour within a single daylight period.
- ♦ **short duration** - daytime work that occupies a location up to one hour.
- ♦ **mobile** - work that moves continuously or intermittently (stopping up to approximately 15 minutes).

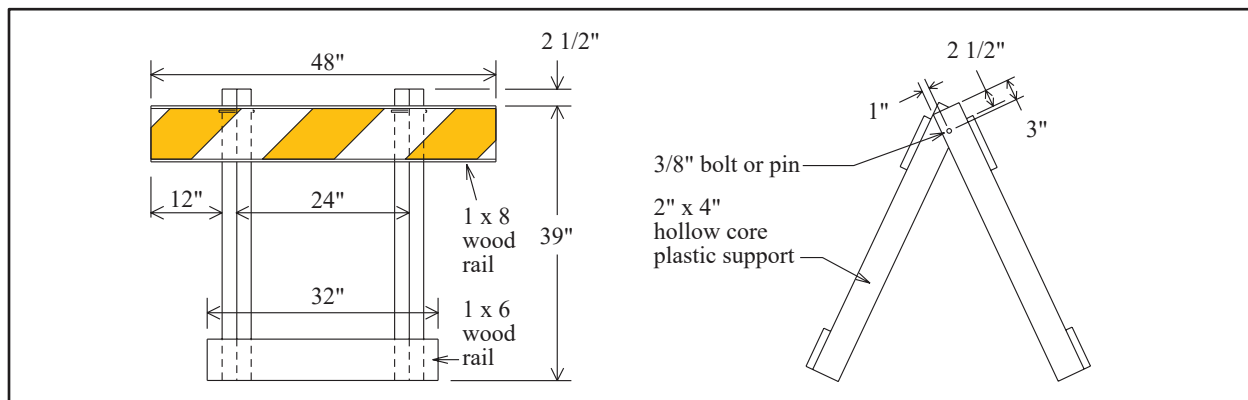


## **C. TYPE-I BARRICADES**

Type-I barricades shall comply with the requirements of the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD). Warning lights shall not be attached to barricades. Barricades shall be no greater than 8 feet in length.

### **C.1. Folding Type-I Barricade Systems**

- ❖ Hollow-Profile Plastic Lumber (HPPL), 2 x 4 HPPL uprights and 1 x 8 HPPL, 1 x 8 wood or plywood rails (Figure C-1). Wood shall be No. 2 SYP or equivalent. Plywood shall be 5/8-inch x 8-inch marine grade, CCA pressure treated, CDX or similar plywood with water resistant glue. Paint all wood surfaces white if not covered by reflective sheeting. Plastic components are available from:
  - ♦ Aeolian Enterprises.
  - ♦ Centerline Supply, Inc.
  - ♦ Fender Enterprises, Inc.
  - ♦ Three D Traffic Works, Inc.

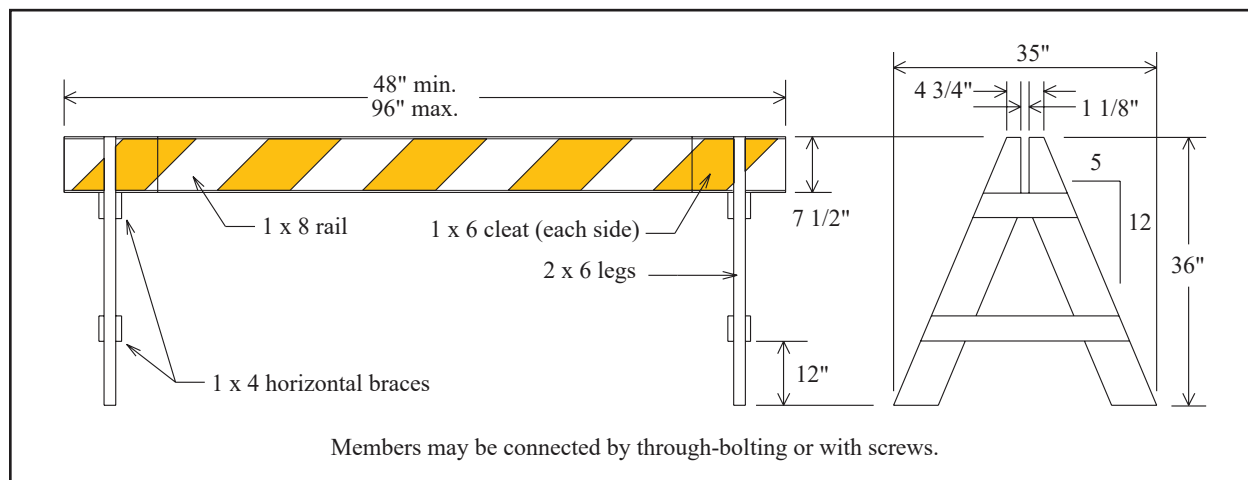


**Figure C-1. Generic folding Type-I Barricade made from HPPL**

- ❖ Folding barricade with steel legs and plastic or plywood rails (Bent Mfg. Co. BDAA, Inc.).
- ❖ Universal Plastic Barricade (Bent Mfg. Co. BDAA, Inc.).
- ❖ Plank-A-Cade folding plastic barricade (Flasher Flare South East, Inc.).
- ❖ Fibercade folding plastic barricade (Plasticade Products).
- ❖ Plastic Barricade Model PRB-124 (Cortina Safety Products).
- ❖ TD2100 all-plastic barricade (Three D Traffic Works, Inc.).
- ❖ TD2150 Works Barricade all plastic (Three D Traffic Works, Inc.).
- ❖ TD2200 Works Barricade, Plastic Panels and Galvanized Legs (Three D traffic Works, Inc.).
- ❖ TD2250 Works Barricade, Plastic Panels and Steel Legs (Three D traffic Works, Inc.).
- ❖ TD2300 Works Barricade, Wood Panels and Galvanized Legs (Three D traffic Works, Inc.).
- ❖ TD3000 configured as a Type I or Type II barricade only using only rails contained on this list. Components are not be used as a sign support. (Three D Traffic Works, Inc.).
- ❖ Economy plastic folding barricade (TraFFix Devices, Inc.).
- ❖ High-Impact plastic folding barricade (TraFFix Devices, Inc.).
- ❖ High-Impact plastic panel and steel leg (12 and 14 ga.) folding barricade (TraFFix Devices, Inc.).

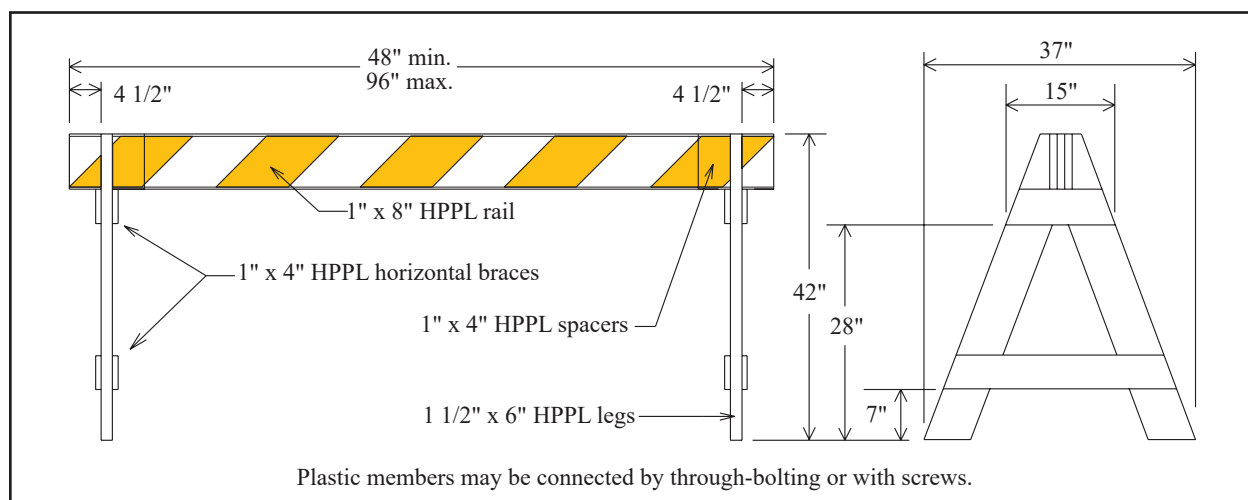
## C.2. A-Frame Type-I Barricade Systems

- ❖ Wood, two 2 x 6 A-frames with 1x8 rail (Figure C-2). Wood shall be No. 2 SYP or equivalent.



**Figure C-2. Generic wooden A-frame Type-I Barricade**

- ❖ Hollow-profile plastic lumber (HPPL), 1 x 8 rail, 2 x 6 legs, and 1 x 4 braces (Figure C-3). This barricade shall be a minimum of 36 inches and a maximum of 42 inches tall. The rail may vary from 4 to 8 feet in length.

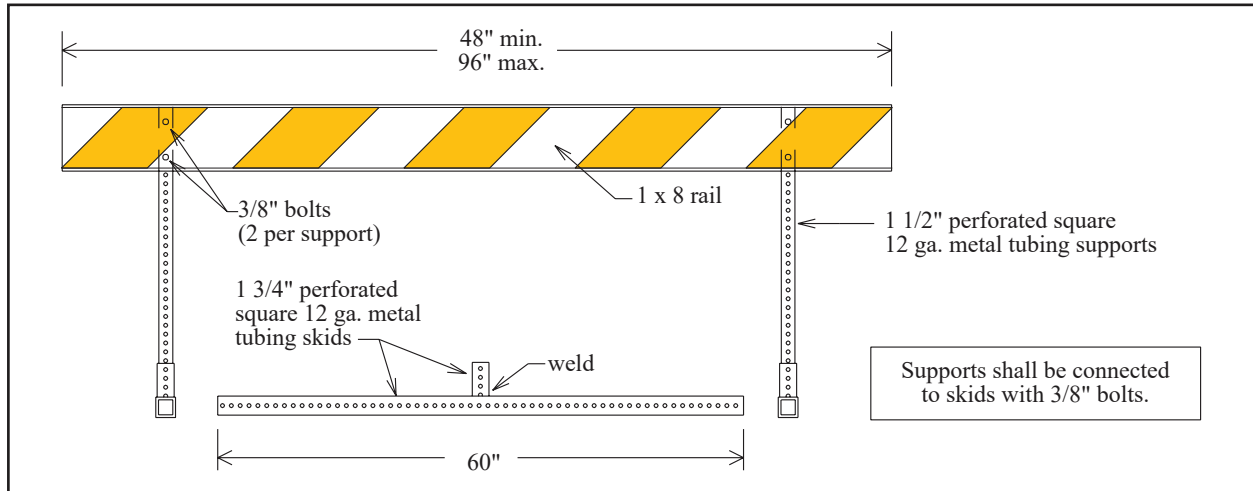


**Figure C-3. Generic HPPL A-frame Type-I Barricade**

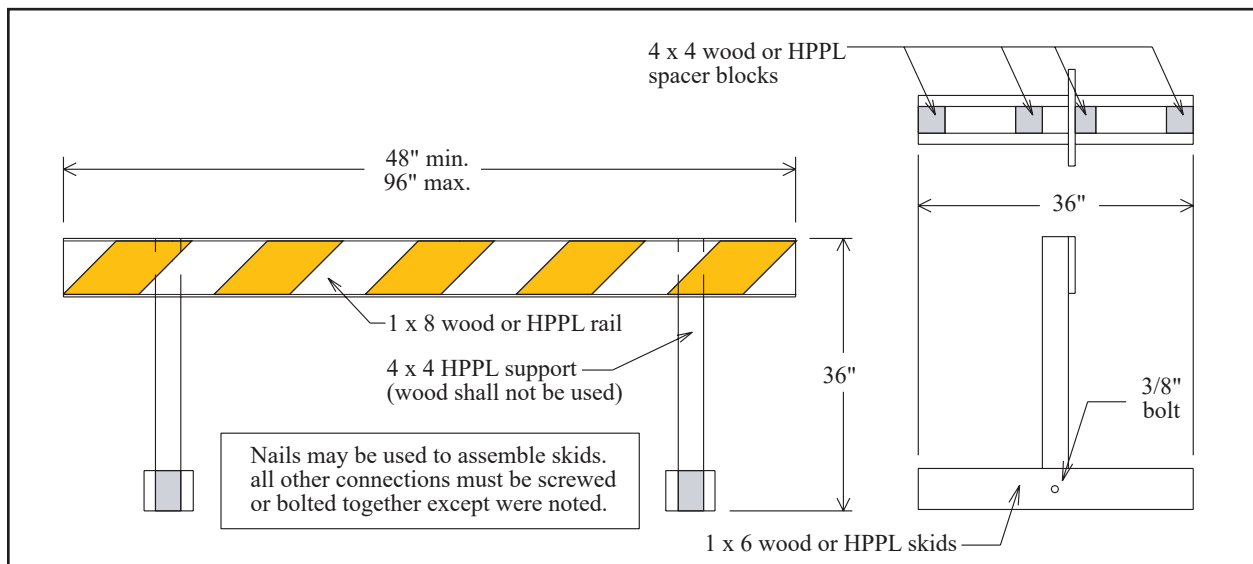
- ❖ Parade Style A-Frame Barricade (Cortina Safety Products).
- ❖ A-frame plastic barricade (Fender Enterprises, Inc.).
- ❖ A-frame plastic barricade (Cortina Safety Products).
- ❖ TD3000 configured as a Type I or Type II barricade only using only rails contained on this list. Components are not be used as a sign support. (Three D Traffic Works, Inc.).
- ❖ Traffix-"A"-CADE™ rigid A-frame barricade system and Traffix-RAIL™ or 1 x 8 No. 2 SYP (or equivalent) (Traffix Devices, Inc.).

### C.3. Skid Mount Type-I Barricade

Type-I Skid mounted barricades (Figures C-4 and C-5) can be made with the same rails, supports, and skids allowed for type-III barricades. A skid mount type-I barricade should be no more than 36 inches tall. Stiffeners and mid-stiffeners are not needed for the construction of type-I barricades.



**Figure C-4. Generic perforated square metal tubing skid-mount Type-I Barricade**



**Figure C-5. Generic wood & HPPL skid-mount Type-I Barricade**

Pre-assembled type-I barricade (skid type) systems are available from:

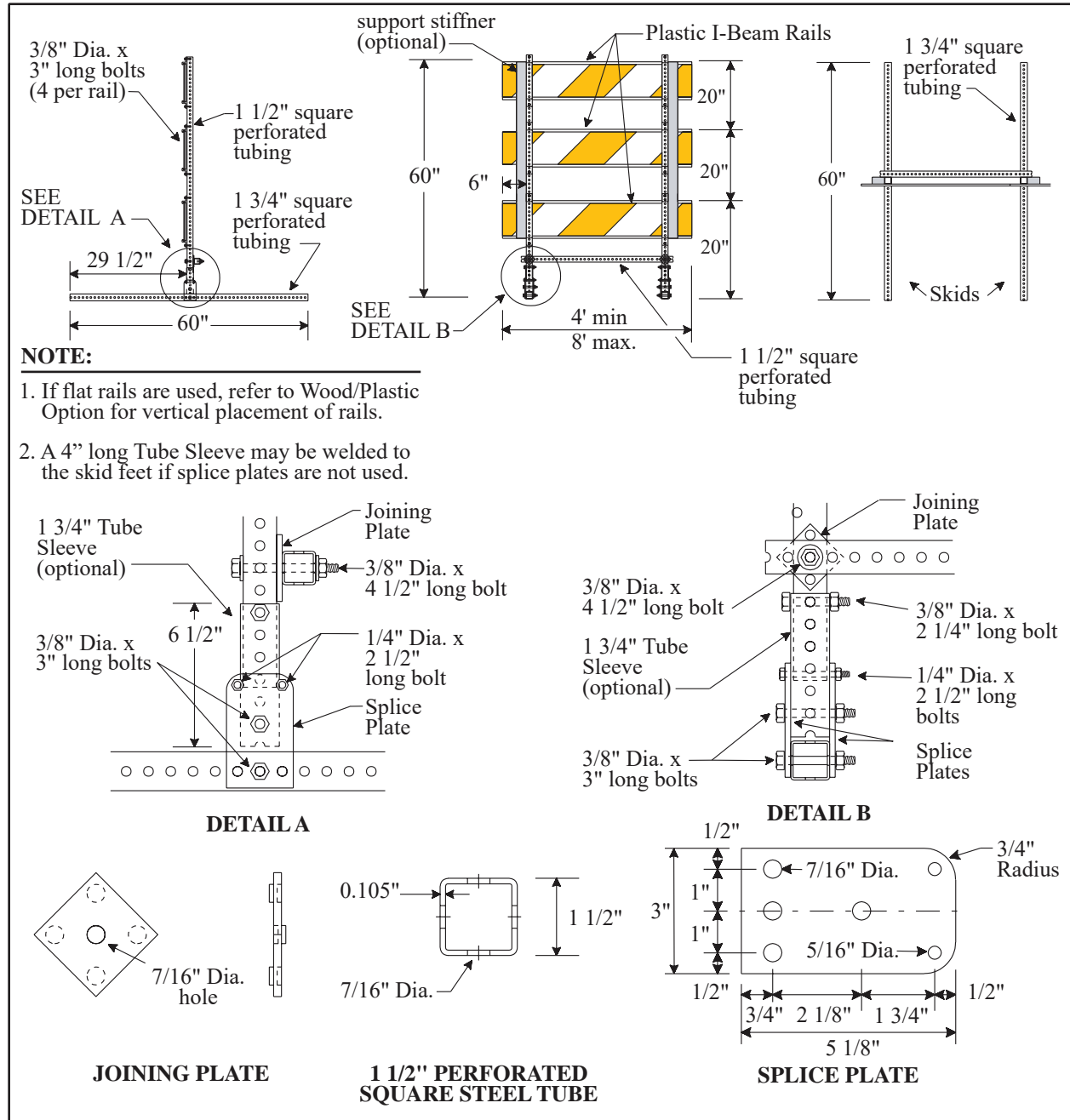
- ◆ Melba, USA - System '98™ Models M1B-1-24 and M2B-1-48 (Eastern Metal / USA Sign).
- ◆ Fendercade type-I modular barricade system (Fender Enterprises, Inc.).
- ◆ HPPL barricade with rubber skids (Rad-Tec Fabricators, Inc.).
- ◆ Traffix-CADE™ modular barricade system (Traffix Devices, Inc.).

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## D. TYPE-III BARRICADES

Type-III barricades shall comply with the requirements of the current *Barricade and Construction Standards* (BC Sheets) and the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD). Warning lights shall not be attached to barricades. Barricades shall be no greater than 8 feet in length.

A lower cross member (Figure D-1) is often needed on some barricade system with plastic rails. The purpose of the rail is to provide structural support if the rails cannot. The presence or absence of the rail has no bearing on the crashworthiness of the barricade.



**Figure D-1. Perforated square metal tubing barricade with plastic rails showing lower structural cross member**

## D.1. Type-III Barricade Systems

### D.1.a. Type III Barricades

- ❖ Type-III barricades may be obtained as complete units from the following:
  - ◆ Bent Mfg. Co. BDAA, Inc.
  - ◆ Cortina Safety Products.
  - ◆ Davidson Plastics Corporation (Model T3B).
  - ◆ Eastern Metal / USA Sign  
(Model B35-8EG-R and Melba, USA - System '98™ Model M2B-3, Melba “Long Board”).
  - ◆ Fender Enterprises, Inc. (Models 047HI).
  - ◆ Hwy Com, Inc.
  - ◆ IRS™ Type III Barricade.
  - ◆ PBS, Inc.
  - ◆ Plasticade Products (Plasticade Telespar Type III Barricade with PSST uprights and feet or PSST uprights and angle iron feet).
  - ◆ Plasticade Products (Power Post Plastic uprights with PSST or angle iron feet).
  - ◆ Plasticade Products (Type III Barricade with angle iron uprights and feet).
  - ◆ Plastic Safety Systems, Inc. (Anchor Mast).
  - ◆ Plastic Safety Systems, Inc. (LaneGard 3).
  - ◆ Rad-Tec Fabricators, Inc.
  - ◆ Recycled Plastic Products, Inc.
  - ◆ Three D Traffic Works, Inc. (Model TD2400 plastic rails and uprights with PSST, angle steel, or 35 lb rubber based designed for this product).
  - ◆ Three D Traffic Works, Inc. (Model TD2500 wood rails with angle steel base).
  - ◆ Three D Traffic Works, Inc. (Model TD2550 wood rails with PSST base).
  - ◆ Three D Traffic Works, Inc. (Model TD2600 plastic rails with angle steel base).
  - ◆ Three D Traffic Works, Inc. (Model TD2650 plastic rails with PSST base).
  - ◆ Traffix Devices, Inc. (Models 5004-HI-2 & 5008-HI-2).
  - ◆ Western Highway Products, Inc. (Ulti-Mate Barricade).

### D.1.b. Type III Barricades for road closures

- ❖ Valtir, LLC. (Yodock 2001, Energy Dispersement Cell)

## D.2. Type-III Barricade Components

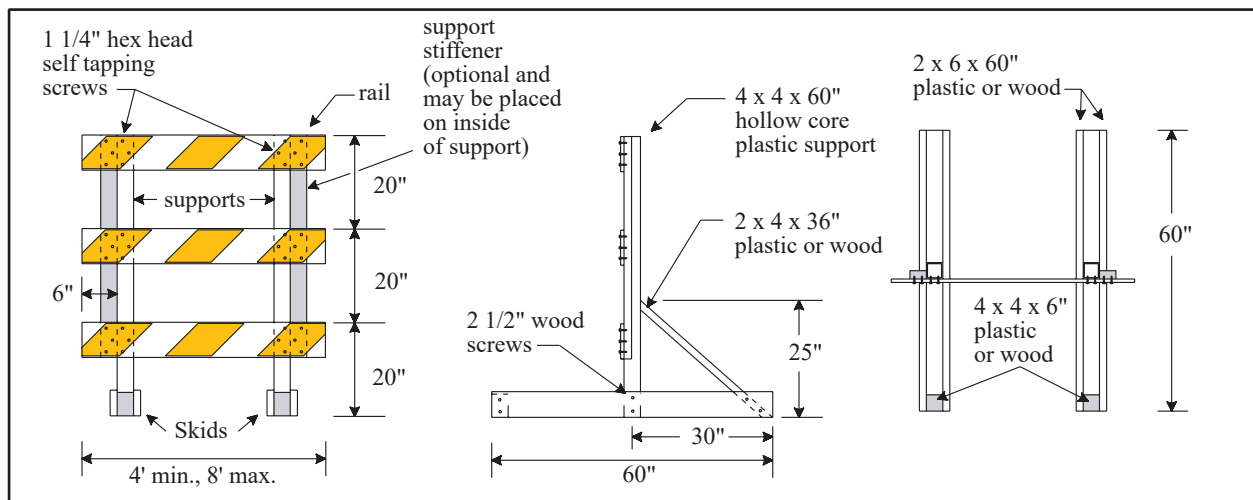
### D.2.a. Rails (Type-III Barricade)

- ❖ Wood, 1 x 8 No.2 SYP or equivalent structurally equivalent grade.
- ❖ Plywood, 1/2 or 5/8 inch x 8 inch. Marine Grade, CCA Pressure-Treated, CDX or similar plywood with water-resistant glue are acceptable rail materials for contractor barricades. Use only Marine Grade plywood for barricades that will remain after project completion. Paint all wood surfaces white if not covered by reflective sheeting.
- ❖ High-density polyethylene (HDPE), I-beam, 0.7 lb/ft maximum, 8-inch single thickness web, and hollow core flanges.
- ❖ Traffix-RAIL (Traffix Devices, Inc.) can be used alone or with Traffix Device's Rail Clip.
- ❖ Hollow-profile plastic lumber (HPPL), 1 x 8 rectangular, 0.8 lb/ft max. May have internal stiffeners.
  - ◆ Aeolian Enterprises.
  - ◆ CenterLine Supply, Inc.
  - ◆ Cortina Safety Products.
  - ◆ Eastern Metal / USA Sign.
  - ◆ Fender Enterprises, Inc.
  - ◆ Flasher Flare South East, Inc.
  - ◆ Itasca Plastics.

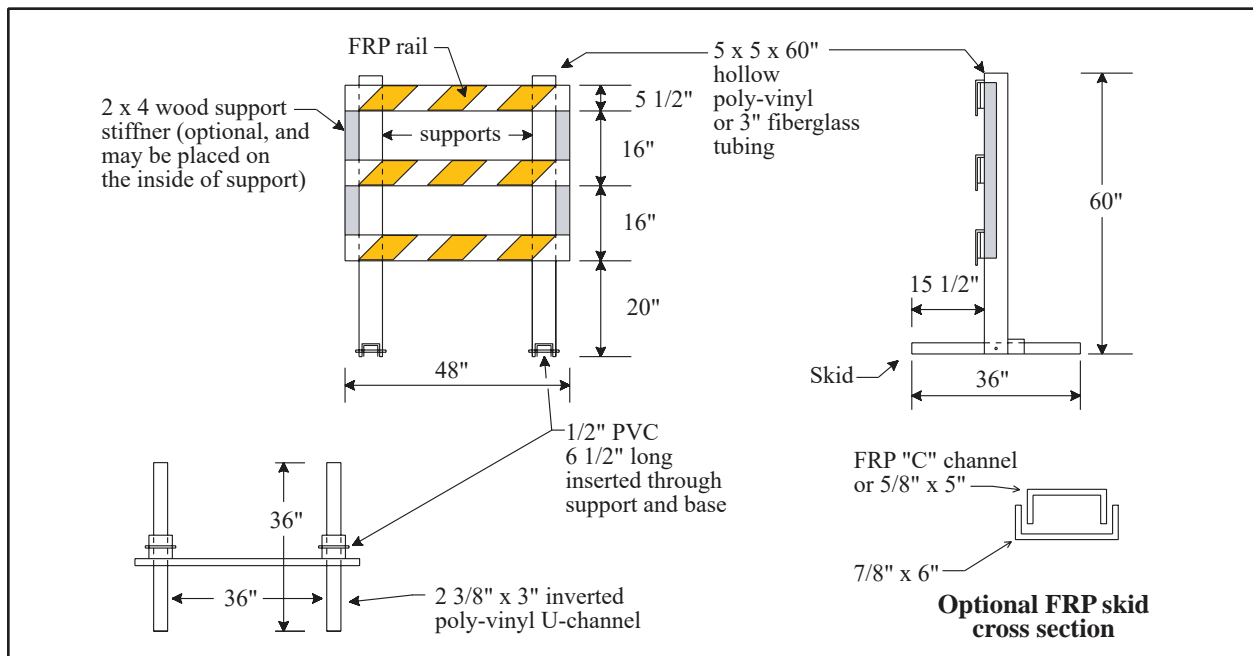
- ◆ Plasticade Products.
  - ◆ Plastic Safety Systems, Inc.
  - ◆ Recycled Plastic Products, Inc.
  - ◆ Three D Traffic Works, Inc.).
- ❖ InteCell® 13 to 16 mm integral skin expanded foam PVC sheet. (Inteplast Group, Ltd.).

#### D.2.b. Supports (Skid-Type Type-III Barricade)

- ❖ Fiberglass reinforced plastic (FRP) Pipe, 3-inch diameter, 1/8- inch wall thickness. Must meet *DMS-4410, Fiberglass Reinforced Plastic Sign Supports*.
  - ◆ Hwy Com, Inc.
- ❖ High-density Polyethylene (HDPE) Pipe, 3-3/4 inch diameter, 0.089-inch wall thickness.
  - ◆ Eastern Metal / USA Sign.
- ❖ Hollow-profile plastic lumber (HPPL), 4 x 4 square, 0.6 lb/ft maximum.
  - ◆ Aeolian Enterprises.
  - ◆ Bufftech.
  - ◆ Fender Enterprises, Inc.
  - ◆ Plastic Safety Systems, Inc.
  - ◆ Recycled Plastic Products, Inc.
- ❖ Steel tubing, perforated square metal, 1-1/2 inches square, 12 gauge.
  - ◆ Allied Tube and Conduit Corporation.
  - ◆ Centerline Supply, Inc.
  - ◆ Fender Enterprises, Inc.
  - ◆ Northwest Pipe Co.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation.
  - ◆ Western Highway Products, Inc.
- ❖ Steel tubing, circular metal, 2-3/8 inches diameter with 0.080 or 0.095-inch wall thickness (thin wall).
  - ◆ Northwest Pipe Company or any other manufacturer.
- ❖ X-tube, 1-3/4 inch square plastic with X-stiffener, 0.6 lb/ft maximum.
  - ◆ Centerline Supply, Inc.
  - ◆ Davidson Plastics Corporation.
  - ◆ Three D Traffic Works.



**Figure D-2. Wood/plastic Type-III Barricade**



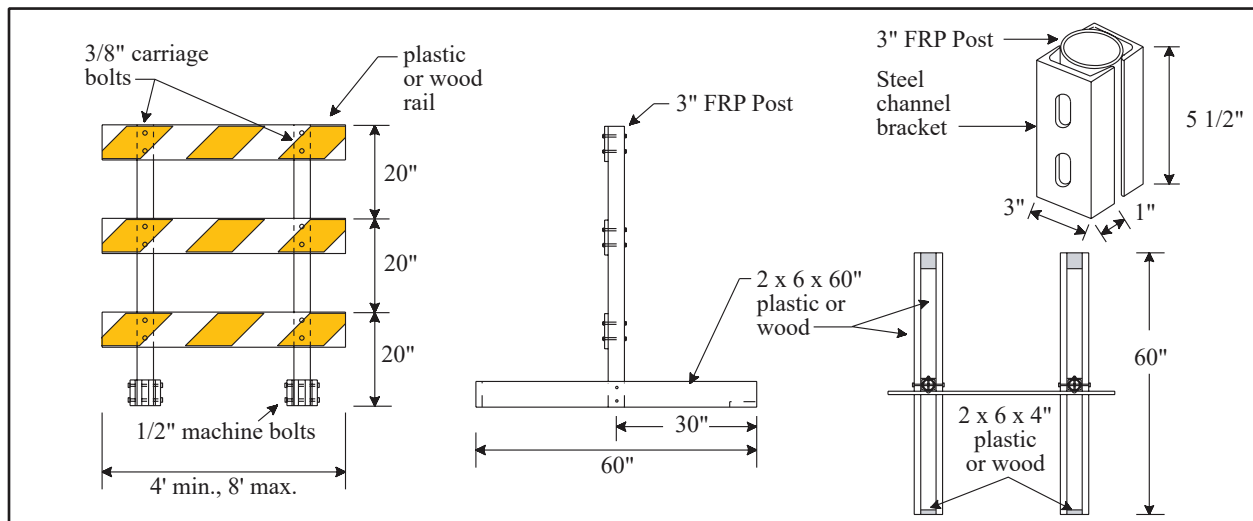
**Figure D-3. Plastic/fiberglass Type-III Barricade**

#### D.2.c. Stiffeners (Type-III Barricade)

Stiffeners are not required. The contractor may choose to use them if they aid in setting up or taking down the barricade.

- ❖ Wood, 2 x 4 No. 2 SYP or equivalent.
- ❖ Hollow-profile plastic lumber (HPPL), 2 x 4 rectangular or 4 x 4 square, 0.6 lb/ft maximum.
  - ◆ Aeolian Enterprises.
  - ◆ Bufftech.
  - ◆ Fender Enterprises, Inc.
  - ◆ Plastic Safety Systems, Inc.
  - ◆ Recycled Plastic Products, Inc.
- ❖ Steel tubing, perforated square metal, 1-1/2 inches square, 12 gauge.
  - ◆ Allied Tube and Conduit Corporation.
  - ◆ Fender Enterprises, Inc.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation.
  - ◆ Western Highway Products, Inc.
- ❖ Steel tubing, circular metal, 2-3/8 inches diameter with 0.080 or 0.095-inch wall thickness (thin wall).
  - ◆ Northwest Pipe Company or any other manufacturer.
- ❖ Solid plastic lumber (SPL), 2 x 4 rectangular.
  - ◆ Metro Plastic Barricades.
  - ◆ Recycled Plastic Products, Inc.
- ❖ X-tube, 1-3/4 inch square plastic with X-stiffener, 0.6 lb/ft maximum.
  - ◆ Centerline Supply, Inc.
  - ◆ Davidson Plastics Corporation.





**Figure D-4. Wood/plastic/fiberglass Type-III Barricade**

#### D.2.d. Mid-rail Stiffeners (Type-III Barricade)

Mid-rail stiffeners are not required unless there is noticeable twisting of the rails due to lack of support.

- ❖ Wood, 2 x 4 No. 2 SYP or equivalent.
- ❖ Hollow-profile plastic lumber (HPPL), 2x 4 rectangular or 4 x 4 square, 0.6 lb/ft maximum.
  - ◆ Aeolian Enterprises.
  - ◆ Bufftech.
  - ◆ Fender Enterprises, Inc.
  - ◆ Plastic Safety Systems, Inc.
  - ◆ Recycled Plastic Products, Inc.
- ❖ X-tube, 1-3/4 inch square plastic with X-stiffener, 0.6 lb/ft maximum.
  - ◆ Centerline Supply, Inc.
  - ◆ Davidson Plastics Corporation.

#### D.2.e. Skids (Type-III Barricade)

- ❖ Wood, 2 x 6 No. 2 SYP or equivalent.
- ❖ Steel tubing, perforated or solid wall square metal, 1-3/4 inches, or 2", 12 gauge.
  - ◆ Allied Tube and Conduit Corporation.
  - ◆ Fender Enterprises, Inc.
  - ◆ Three D Traffic Works.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation.
- ❖ Hollow-profile plastic lumber (HPPL), 2x 6 rectangular.
  - ◆ Aeolian Enterprises.
  - ◆ Bufftech.
  - ◆ Fender Enterprises, Inc.
  - ◆ Plastic Safety Systems, Inc.
  - ◆ Recycled Plastic Products, Inc.
- ❖ Solid plastic lumber (SPL), 2 x 6 rectangular.
  - ◆ Metro Plastic Barricades.
  - ◆ Recycled Plastic Products, Inc.
- ❖ Crumb rubber.
  - ◆ Rad-Tec Fabricators, Inc.

- ◆ Three D Traffic Works.
- ❖ HDPE Extrusion.
  - ◆ Anchor Base (Plastic Safety Systems, Inc.)
- ❖ Angle Steel, 1 1/2" x 1 1/2" x .125"
  - ◆ Three D Traffic Works.

#### **D.2.f. Posts (Fixed-Type Type-III Barricade)**

Supports listed below may have specific allowable anchoring methods, number of posts allowed in 7-foot vehicle path, and soil requirements. Strict adherence to these requirements is essential for the device to function as intended during a crash. The contractor is responsible for installing devices as they were designed to be used.

- ❖ Steel tubing, perforated 1-1/2 inch square, 12 gauge with 7/16-inch holes punched on 1-inch centers. This support may be directly embedded a minimum of 48 inches in both weak and strong soils. As an option, an anchor stub may be used. The anchor stub is the next larger size tubing. Additionally, an 18-inch reinforcing sleeve made from the next larger size tubing may be used. The optional anchor stub, when used, shall be embedded at least 34 inches in strong soils or 55 inches in weak soils with approximately 1 inch protruding above the ground. Both systems may also be set in concrete, soilcrete, or expanding polyurethane foam.
  - ◆ Allied Tube and Conduit Corporation.
  - ◆ Fender Enterprises, Inc.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation.
  - ◆ Western Highway Products, Inc
- ❖ Tubing, circular metal, 2-3/8 inches diameter with 0.080 or 0.095-inch wall thickness (a.k.a. thin wall) used with Poz-Loc Wedge and Socket Foundation. Socket may be used as driveable base in strong soil or it may be set in concrete or expanding polyurethane foam.
  - ◆ Northwest Pipe Company.
- ❖ V-Loc™ Socket System - This anchor system may be used with thin-wall round tubing and 2-inch square tubing. With an adapter, the anchor can also be used with U-channel.
  - ◆ TAPCO - Traffic & Parking Control Co., Inc.
- ❖ Fiberglass reinforced plastic (FRP) pipe may be directly embedded or may be anchored with the Universal Anchor System. No more than 2 posts shall be installed within a 7 foot span. The anchor, if used, should be set in concrete or expanding polyurethane foam. Anchor shall protrude no more than 4 inches from the ground. As an option, the post (without the anchor) may be set in concrete, soilcrete, or expanding polyurethane foam.
  - ◆ Hwy Com, Inc.
  - ◆ Universal Anchor Systems, L.L.C.

#### **D.2.g. Long Term (For application to surface of pavement)**

- ❖ Fiberglass reinforced plastic (FRP) pipe may be anchored with the Universal Anchor System or bolt down Universal Anchor. No more than 2 posts shall be installed within a 7 foot span. The anchor, if used, should be set in concrete or expanding polyurethane foam. Anchor shall protrude no more than 4 inches from the ground. As an option, the post (without the anchor) may be set in concrete, soilcrete, or expanding polyurethane foam.
  - ◆ Hwy Com, Inc.
  - ◆ Universal Anchor Systems, L.L.C.

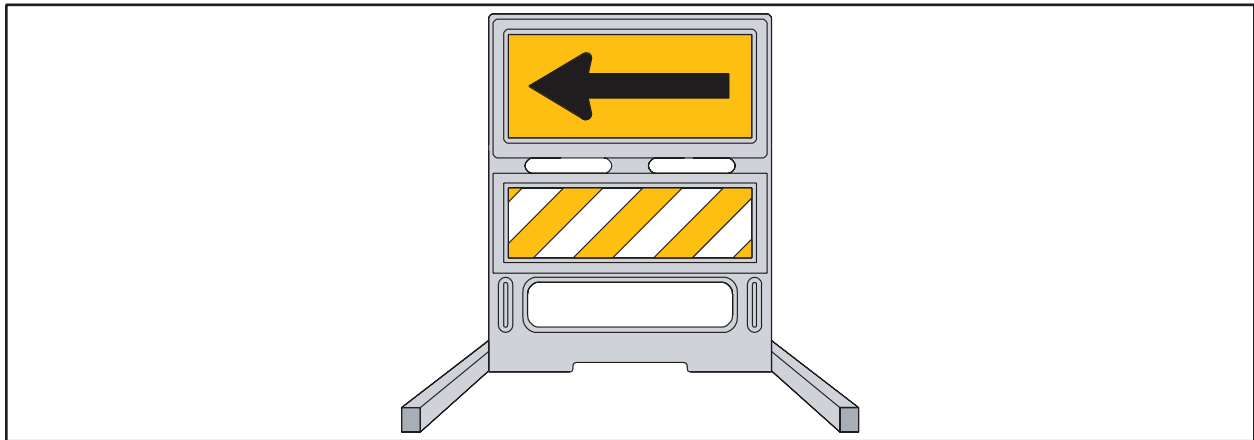
## **E. SPECIAL USE BARRICADES**

### **E.1. Direction Indicator Barricades**

Direction Indicator Barricades shall comply with the requirements of the current Barricades and Construction Standards (BC Sheets) and the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Warning lights shall not be attached to the barricade.

Direction indicator barricades (Figure E-1) are available from:

- ◆ Trailblazer Plus (Cortina Safety Products).
- ◆ IRS® Directional Indicator Barricade (IRS® - Impact Recovery Systems).
- ◆ SafetyCade S.H.R.P. (Plasticade Products).

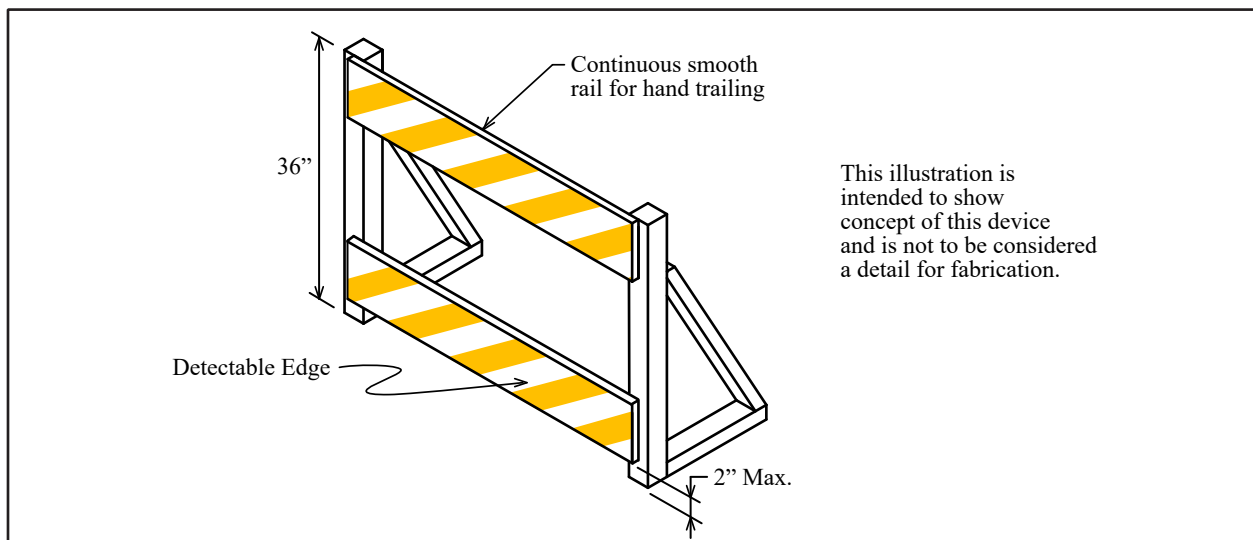


**Figure E-1. Direction Indicator Barricade**

### **E.2 Detectable Pedestrian Barricades**

Detectable Pedestrian Barricades shall comply with the requirements of the Texas Manual on Uniform Traffic Control Devices (TMUTCD). Warning lights shall not be attached to the barricade.

- ◆ Strong Wall ADA Compliant Pedestrian Barricade (Plasticade Products).
- ◆ Safety Rail (Plastic Safety Systems, Inc.).
- ◆ Safety Wall ADA-Compliant Pedestrian Barricade (Plastic Safety System, Inc.).



**Figure E-2. Detectable Pedestrian Barricade**

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## **F. VERTICAL PANELS**

Vertical Panels (VPs) shall comply with the requirements of the current *Barricade and Construction Standards* (BC Sheets) and the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD). Warning lights shall not be attached to VPs.

### **F.1. Rigid Vertical Panel**

#### **F.1.a. Driveable Supports for Rigid Vertical Panels**

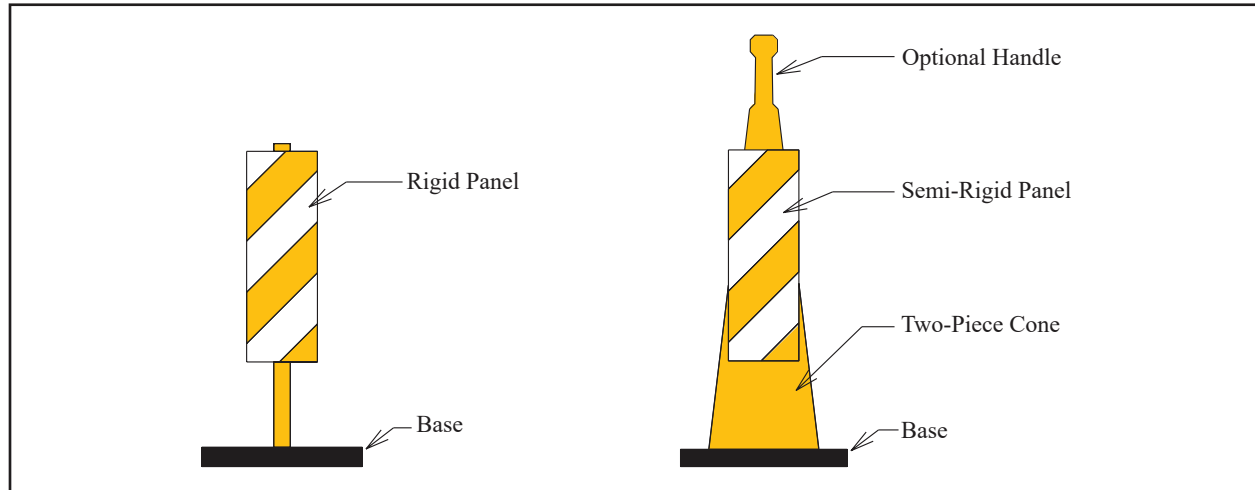
- ❖ Flange channel, steel, 2.0 lb/ft maximum.
- ❖ Pipe, steel, 1/2 inch schedule 40.
- ❖ Angle, steel, 1-1/2 inch x 1-1/2 inch.
- ❖ Wood, 2 x 4 No. 2 SYP or equivalent.
- ❖ Flexible delineator posts which comply with *DMS-4400, Flexible Delineator and Object Marker Post (Embedded and Surface Mount Types)*.

#### **F.1.b. Substrates for Rigid Vertical Panels**

- ❖ Plastic, solid 1/8 to 1/4-inch thick, fiber-reinforced and non-reinforced.
  - ◆ Polyethylene panel, 1/8-inch thickness (Fender Enterprises, Inc.).
  - ◆ Polyethylene panel, 1/4-inch thickness (Fender Enterprises, Inc.).
  - ◆ ABS acrylic (International Plastics Corporation).
  - ◆ Fiberglass reinforced polycarbonate (International Plastics Corporation).
  - ◆ Polyplate® Fiberglass reinforced plastic sign panel, 0.135-inch thick. (Sequentia Incorporated).
  - ◆ Fiber-Brite (U.S. Highway Products).
  - ◆ Survivor (U.S. Highway Products).
- ❖ Plastic, Waffle Board, 1/4-inch thick.
  - ◆ Fender Enterprises, Inc.
- ❖ Plastic, Blow Molded High-Density Polyethylene Panel.
  - ◆ Traffix Devices, Inc.
  - ◆ Itasca Plastics.
- ❖ Plastic, Corrugated Panel with or without fiberglass reinforcement.
  - ◆ Coroplast 10mm extruded thinwall fluted plastic sheet (Coroplast, Inc.).
  - ◆ IntePro® 10mm extruded thinwall fluted plastic sheet (Inteplast Group Ltd.).
  - ◆ Endurance™ Sign (Reflexite Corporation).
  - ◆ Coro-Lite Corrugated FRP Sign Panel, 0.25 inches thick (US Highway Products).
  - ◆ Fiber-Brite Fiberglass-Reinforced Plastic Sign Panel, 0.135 inches thick (US Highway Products).
- ❖ Plywood, 3/8 or 1/2-inch thick marine grade, CCA pressure treated, CDX or similar plywood with water-resistant glue. Paint all wood surfaces white if not covered by reflective sheeting.

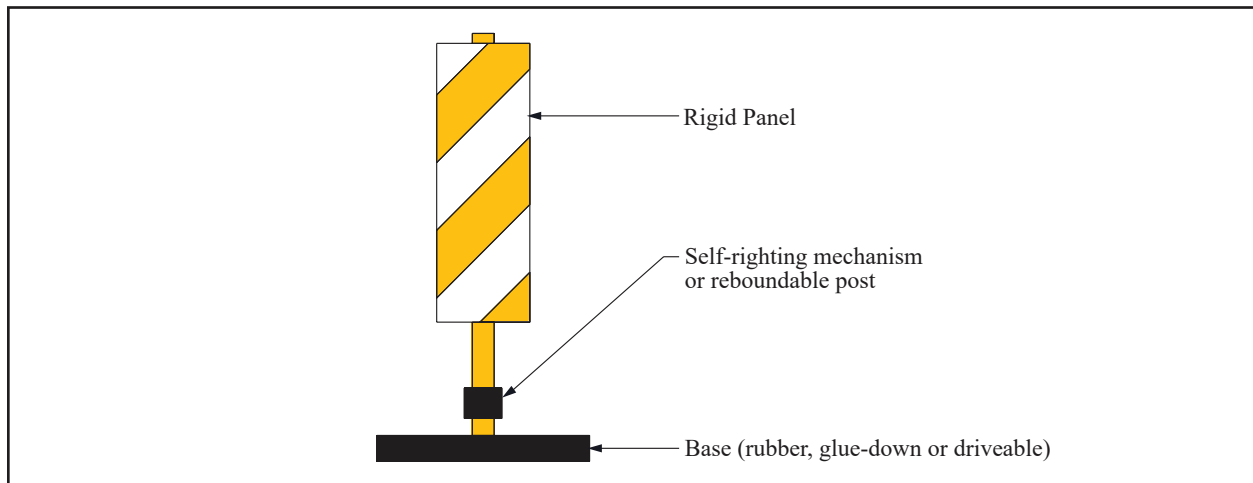
**F.1.c. Portable Rigid Vertical Panel Systems**

A portable rigid vertical panel (Figure F-1) is usually made with a rigid plastic panel mounted on a plastic upright with a base or by attaching a semi-rigid panel to a standard two-piece cone



**Figure F-1. Typical portable rigid vertical panels**

- ◆ Any compliant two-piece cone with a semi-rigid substrate panel attached securely.
- ◆ Plastic pipe, 1-1/2 inch Schedule 40 PVC with an approved panel and a rubber base.
- ◆ T-Top Stackable vertical panel with 30 lb. base (Bent Mfg. Co. BDAA, Inc.).
- ◆ Ultra Panel - stackable vertical panel with 30 lb. base (Bent Mfg. Co. BDAA, Inc.).
- ◆ Models VPB-36 and 44 VPs (Cortina Safety Products).
- ◆ TrailBlazer Vertical Panel (Cortina Safety Products).
- ◆ 45" Vertical Panel with 30 lb. base (Custom-Pak, Inc.)
- ◆ Melba, USA - System '98™ Model M1B-V-36EG/EG (Eastern Metal / USA Sign).
- ◆ Fendercade VP (Fender Enterprises, Inc.).
- ◆ 8 x 24 or 12 x 36 Inch VP (Flasher Flare South East, Inc.).
- ◆ Divertor with 30 lb. base (Lakeside Plastics, Inc.).
- ◆ MSi DuraStem™ recycled VP (MSi - Material Sales International).
- ◆ 42 inch Navigator™ VP (Plastic Safety Systems, Inc.).
- ◆ Gemstone Vertical Panel (Plasticade Products).
- ◆ Minicade VP (Plasticade Products).
- ◆ Narrowcade VP (Plasticade Products).
- ◆ Vertical Panel with crumb rubber base (Rad-Tec Fabricators, Inc.).
- ◆ DDK VP (Service Signing, L.C.).
- ◆ Tracker VP with 30 lb. base (Stripes & Stops Co., Inc.).
- ◆ TD6000 vertical panel without light (Three D Traffic Works, Inc.).
- ◆ TD6500 Universal Vertical Panel with 32 lb rubber base designed for this device (Three D Traffic Works, Inc.).
- ◆ VERSA Panel (Traffic Control Products Group).
- ◆ "Blow Molded" VP (TraFFix Devices, Inc.).
- ◆ Grabber VP with 30 lb. base (TraFFix Devices, Inc.).
- ◆ SafetyCade VP (Plasticade Products).



**Figure F-2. Self-righting vertical panel**

## **F.2. Self-Righting Vertical Panel**

A self-righting vertical panel (Figure F-2) is designed to stand back up after an impact.

- ◆ Models 52X, 55X or 56X Vertical Panel or 54X Opposing Traffic Lane Divider (Davidson Traffic Control Products).
- ◆ IRS® self-righting VP (IRS® - Impact Recovery Systems).  
Note: May also be purchased with opposing traffic lane divider symbol in lieu of vertical panel.
- ◆ Safe-Hit Reboundable VP (Safe-Hit Corporation).
- ◆ TD5275 Boomerang VP, glued down or bolted down or on 32 lb rubber base (Three D Traffic Works, Inc.) Note: May also be purchased with opposing Traffic Lane Divider symbol in lieu of vertical panel.
- ◆ H.I.T.M.E. self-righting VP (Traffic Control Systems).

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**G. EDGELINE CHANNELIZERS**

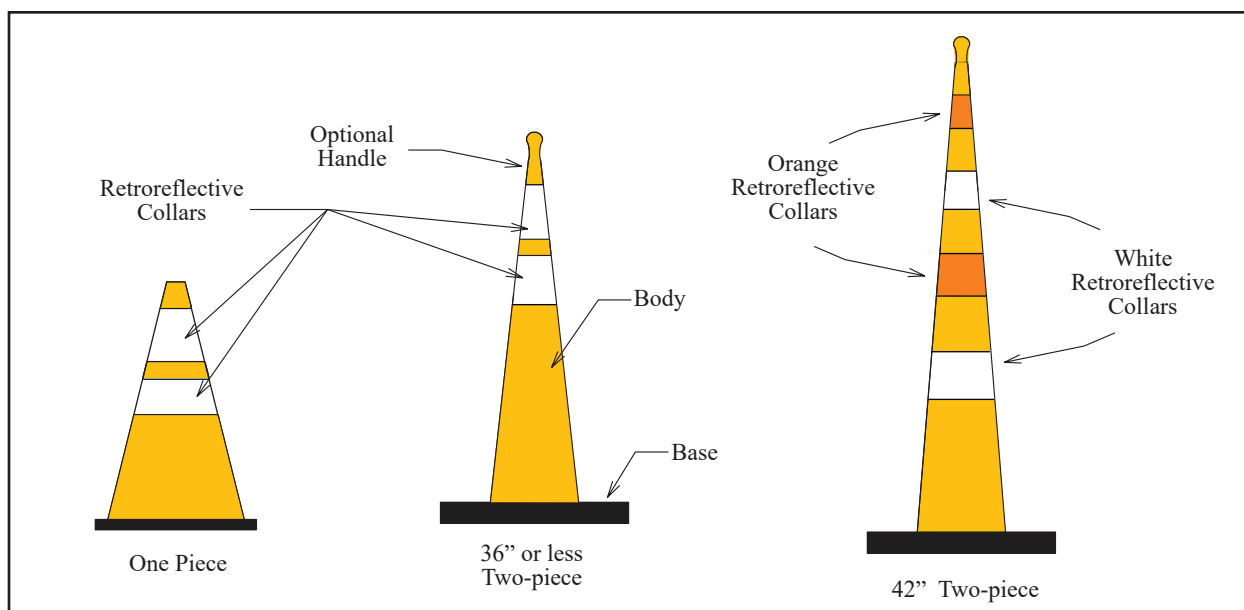
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## H. CONES

Cones (Figure H-1) shall comply with the requirements of the current *Barricade and Construction Standards* (BC Sheets) and the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD). Warning lights shall not be attached to cones. Cones may be used as channelizing devices for short-term work. When used at night, retroreflective striping shall conform to *Part 6 of the Texas Manual on Uniform Traffic Control Devices* which states that “Retroreflectorization of cones that are 28 to 36 inches in height shall be provided by a 6 inch white band located 3 to 4 inches from the top of the cone and an additional 4 inch wide white band approximately 2 inches below the 6 inch band. Retroreflectorization of cones that are more than 36 inches in height shall be provided by horizontal, circumferential, alternating orange and white retroreflective stripes that are 4 to 6 inches wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 3 inches in width.”



**Figure H-1. One and two-piece plastic cones**

### H.1. One-Piece Cones

One-piece cones from any manufacturer are acceptable. One-piece cones must be a minimum of 28 inches tall and weigh a minimum of 9.5 lbs. One-piece cones shall not be used at night without dedicated personnel on duty to maintain them.

### H.2. Two-Piece Cones

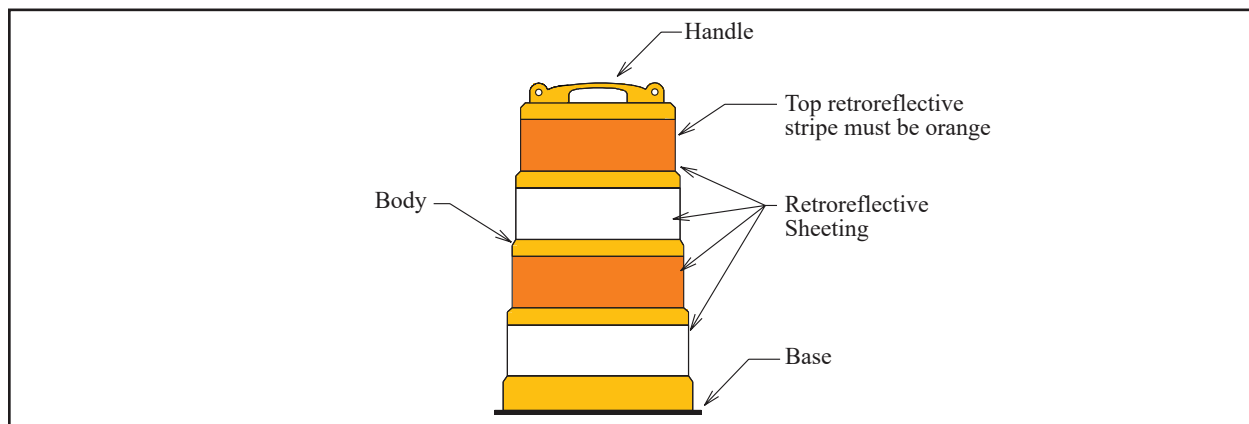
Bases for 42-inch two-piece cones must weigh at least 30 lb. 28-inch two-piece cones must meet the minimum 9.5 lbs. requirement of the one-piece cones. Additionally, 28-inch two-piece cones may not be left up overnight unattended. 42-inch two-piece cones may be left up unattended overnight.

- ◆ T-Top Stackable Channelizer with rubber base (Bent Mfg. Co. BDAA, Inc.).
- ◆ 42 inch Tear Drop Stackable Channelizer TDSC-42 (Bent Mfg. Co. BDAA, Inc.).
- ◆ Divertor (Lakeside Plastics, Inc.).
- ◆ Channelizer Cones (Cortina Safety Products).
- ◆ 42” Navicade Channelizing Device (Plasticade).

- ◆ 28 inch Navigator™ (Plastic Safety Systems, Inc.).
- ◆ 42 inch Navigator™ (Plastic Safety Systems, Inc.).
- ◆ TD7000 (Three D Traffic Works, Inc.).
- ◆ TD7500 Ringtop Slim-line channelizer cone (Three D Traffic Works, Inc.).
- ◆ 28 inch Grabber Cone (TraFFix Devices, Inc.).
- ◆ 42 inch Grabber Cone (TraFFix Devices, Inc.).
- ◆ 42 inch Looper Cone (TraFFix Devices, Inc.).
- ◆ 42" C-42 Channelizer Cone (Plasticade).

## I. PLASTIC DRUMS

Plastic Drums (Figure I-1) shall comply with the requirements of the current *Barricade and Construction Standards* (BC Sheets) and the current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD).



**Figure I-1. Plastic drum**

### **I.1. Plastic Drums**

- ❖ Superdome (LDPE or HDPE) Drum (Bent Mfg. Co. BDAA, Inc.) with one of the following bases:
  - ◆ Plastic snap-on (uses sand bags or Bent delineator bases for ballast).
  - ◆ 40 lb. rubber snap-on.
- ❖ Superdome Tire Ring (SDTR) Drum (Bent Mfg. Co. BDAA, Inc.) for use with recycled truck tire sidewall base.
- ❖ Highway Tech Drum (Cortina Safety Products).
  - ◆ # 03-780-4HI
  - ◆ # 03-780-6HI
  - ◆ # 03-782-4HI
  - ◆ # 03-782-6HI
- ❖ Trail Boss (Cortina Safety Products).
- ❖ Model 1500 (LDPE) or Model 1510 (HDPE) Drum (Cortina Safety Products) with one of the following bases:
  - ◆ Plastic snap-on.
  - ◆ 40 lb. solid rubber.
- ❖ THE DIRECTOR with 40 lb rubber base (Lakeside Plastics).
- ❖ Lifeguard® Channelizer with recycled truck tire sidewall base (Plastic Safety Systems, Inc.).
- ❖ Lifeguard II ® (Plastic Safety Systems, Inc.).
- ❖ Rhino Channelizer Drum (HDPE or LDPE) with sand-fillable base or with recycled truck tire sidewall base (Plasticade Products).
- ❖ Commander Traffic Drum (HDPE or LDPE) with recycled truck tire sidewall base (Plasticade).
- ❖ Econocade II Traffic Drum with recycled truck tire sidewall base (Plasticade).
- ❖ LD10 with plain base (Radiator Specialty Company).
- ❖ 18000-HDPE or 18000-LDPE (Traffix Devices, Inc.) with one of the following bases:
  - ◆ Sand bag snap-on.
  - ◆ San-Fil® snap-on.
  - ◆ 40 lb. rubber snap-on.
  - ◆ Recycled truck tire side-wall.
- ❖ Plastic Safety Barrel (Plasticade).
- ❖ Lane Changer Traffic Drum B500LC (Plasticade) with one of the following bases:
  - ◆ 40 lb. rubber base.
  - ◆ Recycled truck tire sidewall.

**I.2. Sign Substrates for Plastic Drums**

- ◆ Coroplast 10mm extruded thinwall fluted plastic sheet (Coroplast, Inc.)  
(Internal ribs should run vertically).
- ◆ Coroplast extruded thinwall fluted plastic sheet, 4mm (and thicker) (Coroplast, Inc.)  
(For use as substrate for Warning Reflector only).
- ◆ Polyethylene panel, 1/8-inch thickness (Fender Enterprises, Inc.).
- ◆ IntePro®10mm extruded thinwall fluted plastic sheet (Inteplast Group Ltd.).  
(Internal ribs should run perpendicular to support).
- ◆ Fiberglass reinforced polycarbonate sign substrate, 5/32-inch thick  
(International Plastics Corporation).
- ◆ ABS acrylic (International Plastics Corporation).
- ◆ Endurance™ Sign (Reflexite Corporation).
- ◆ Polyplate® Fiberglass reinforced plastic sign panel, 0.135-inch thick.  
(Sequentia Incorporated).
- ◆ Fiber-Brite sign panel, 1/8-inch thick (U.S. Highway Products).
- ◆ Survivor (U.S. Highway Products).
- ◆ Coro-Lite Corrugated FRP Sign Panel, 0.25 inches thick (U.S. Highway Products).

## **J. SIGNS AND SIGN SUPPORTS**

Signs and sign supports shall comply with *the Barricade and Construction Standards Sheets* (BC Sheets) and the *Texas Manual on Uniform Traffic Control Devices*. Sign supports that are approved for longer terms may be substituted for shorter-term signs (i.e., permanent sign supports may be used instead of short-term sign supports). Mount all signs used at night and all regulatory signs (used at any time) 7 feet above the edge of the travelway (Figure J-1). Non-regulatory signs used only during the day may be mounted at either the 7 or 1-foot mounting height (Figures J-1 and J-2). All signs used shall be retroreflective according to the requirements of the BC Sheets. Sign supports shall be used with the appropriate foundation system.



**Figure J-1. Long/intermediate-term and regulatory sign mounting**



**Figure J-2. Short-term duration sign mounting**

### **J.1. Permanent Sign Supports**

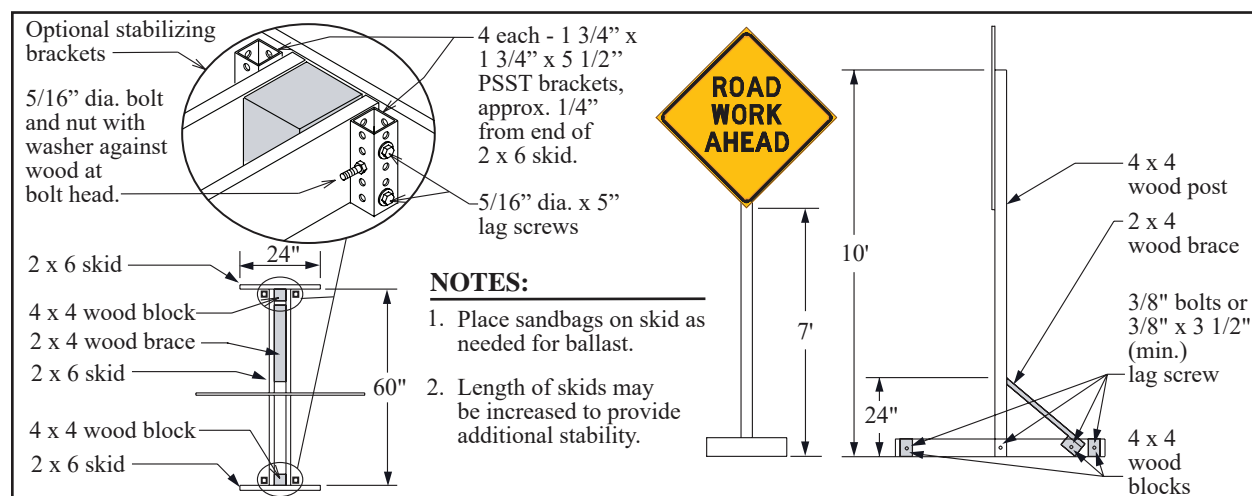
Refer to the TxDOT's *Sign Mounting Details*.

### **J.2. Long-Term / Intermediate-Term Work Zone Sign Supports**

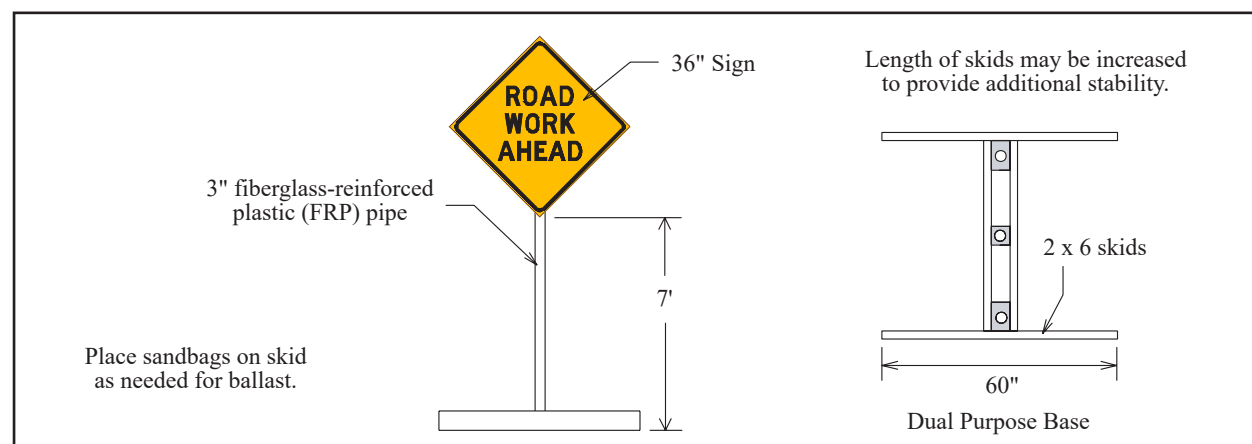
Signs shall be installed in accordance to manufacturer's instructions. In no case shall the height of the non-breakaway portion of the support (i.e., stub) extend higher than 4 inches from the ground.

#### **J.2.a. Portable Sign Supports**

- ◆ Wood Dual Leg, skid design. The skid length shall be at least 60 inches in length. Skid length may be increased for wind conditions if space permits (see BC Standards for assembly details).
- ◆ Wood,( H-leg) (Figure J-3). The skid length shall be at least 60 inches in length. Skid length may be increased for wind conditions if space permits.



**Figure J-3. Wooden long/intermediate-term single leg (H-leg) sign support**

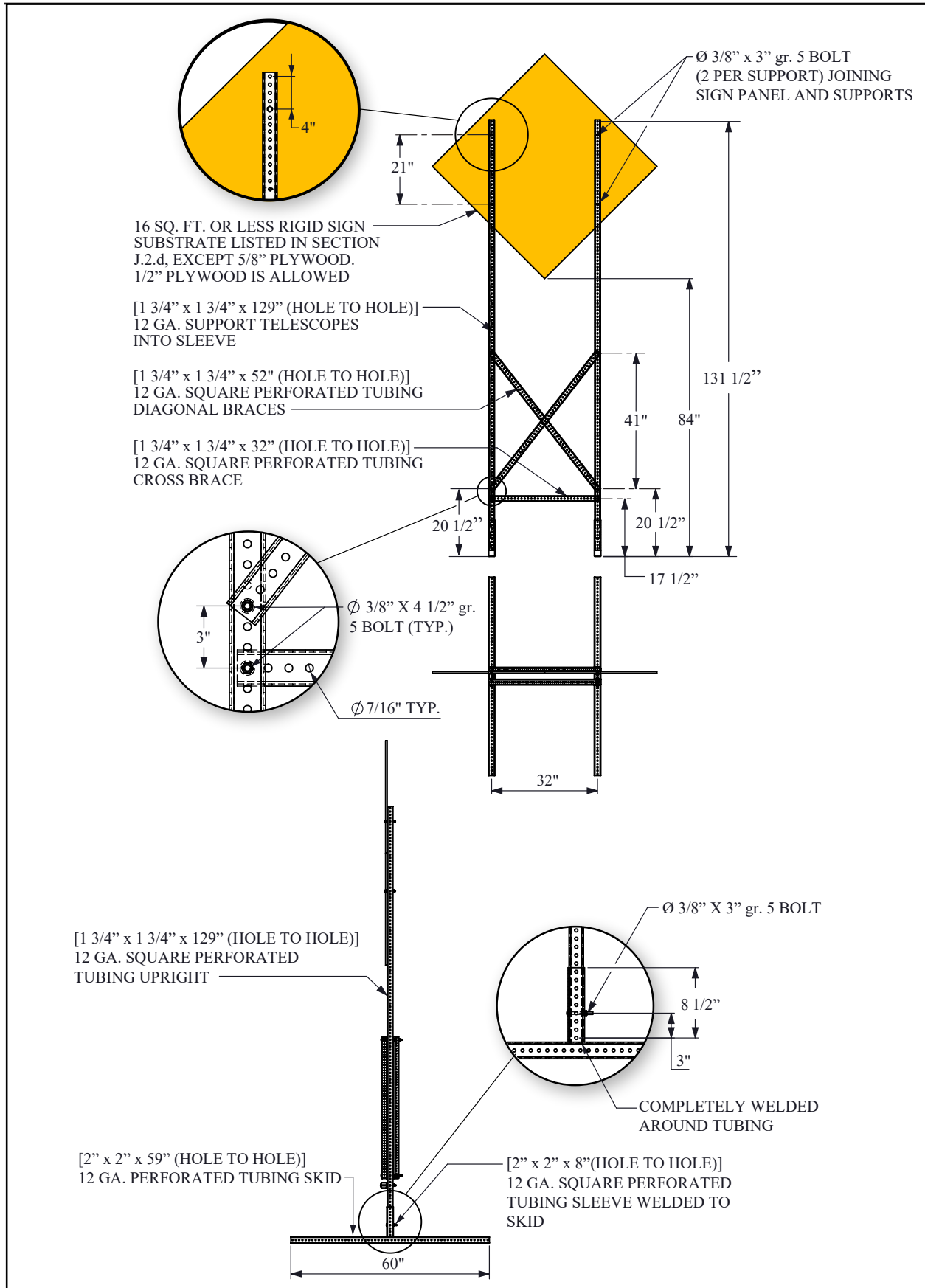


**Figure J-4. Hwy Com's long/intermediate-term single leg (H-leg) sign support  
(7 foot mounting height)**

- ◆ SZ-484-2S Stand for 0.080 aluminum, 3mm and 4mm aluminum composites, roll-up, 10mm and 16mm corrugated plastic substrates (Bone Safety Signs).
- ◆ QV-84 (or SE-7) Stand (Cortina Safety Products).
- ◆ DF-4700 Stand for roll-up signs (Dicke Tool Company).
- ◆ DF-4700TX Stand for roll-up signs (Dicke Tool Company).
- ◆ TF84-RGB Sign Stand for Rigid Signs (Dicke Tool Company).
- ◆ TF84-RUB Sign Stand for Rollup Signs (Dicke Tool Company).
- ◆ X-601 Aluminum Interstate™ Series stand for roll-up signs. (Eastern Metals/USA Sign).
- ◆ FRP pipe with dual-purpose base (Figure J-4). (Hwy Com, Inc.).
- ◆ SS 560, SS 560 A (Korman Signs, Inc.).
- ◆ SS 560 UCA for roll-up signs only (Korman Signs, Inc.).
- ◆ 4860K (MDI - Marketing Displays International).
- ◆ Little Buster™ sign stand (TraFFix Devices, Inc.).
- ◆ Big Buster™ sign stand (TraFFix Devices, Inc.).
- ◆ SS520A tall double spring sign stand (Plasticade).
- ◆ SS620A heavy duty tall double spring sign stand (Plasticade).







**Figure J-4c. Dual Leg PSST skid support for various substrates (7 foot mounting height)**

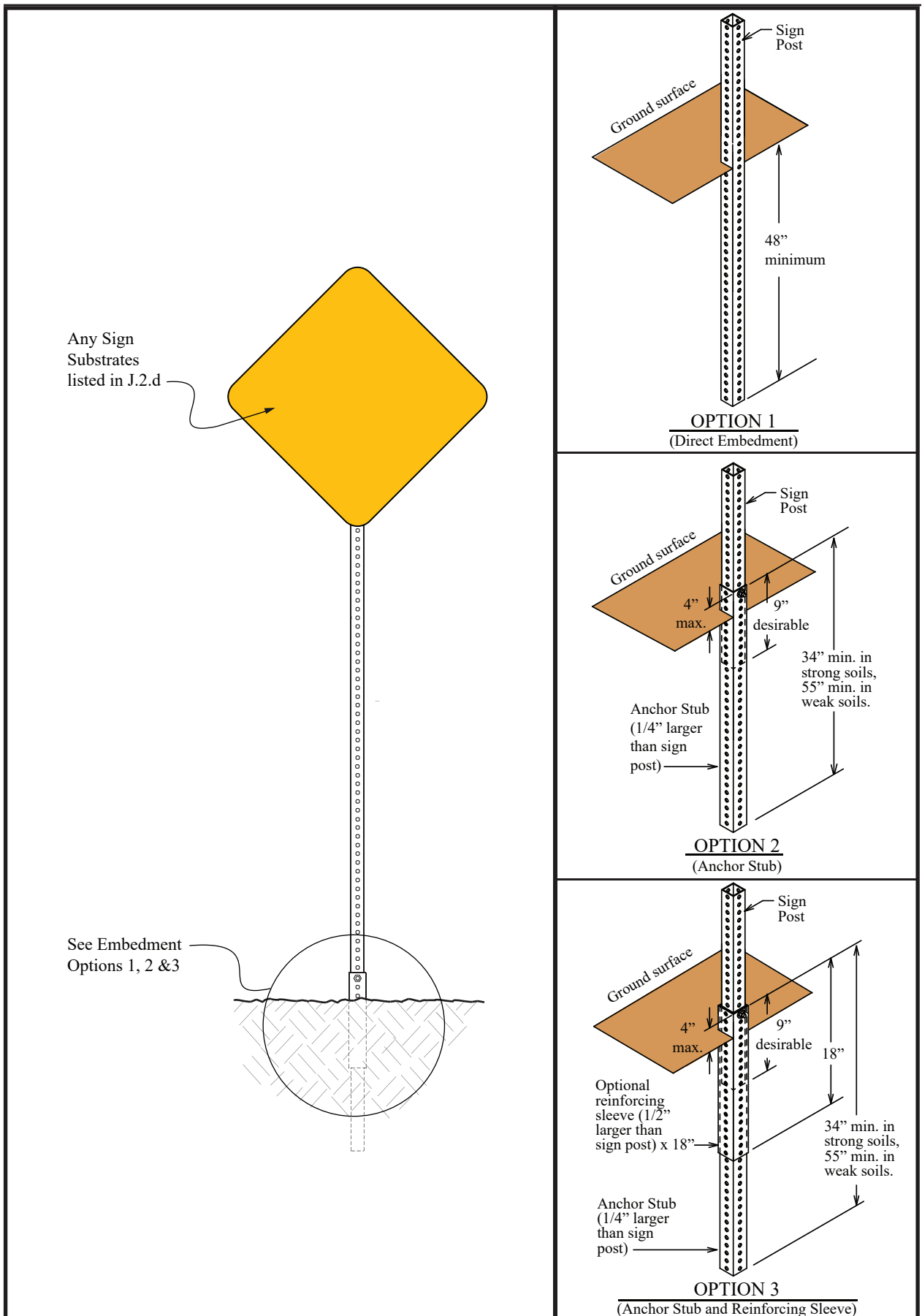
- ❖ Square Steel Tubing suppliers.
  - ◆ Allied Tube and Conduit Corporation.
  - ◆ Centerline Supply, Inc.
  - ◆ Fender Enterprises, Inc.
  - ◆ Northwest Pipe Co.
  - ◆ Maxistrut, Inc.
  - ◆ S-Square Tube Products.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation.

### J.2.b. Post-Type Sign Supports

- ❖ Rectangular-timber signposts, No. 2 SYP or equivalent, 4 x 4 or 4 x 6. If 4 x 6 post is used, 1-1/2 inch weakening holes shall be drilled through the wide face at 4 and 18 inches above the ground. The wide face of the post shall be installed parallel with traffic. No more than 2 posts shall be mounted within a 7-foot span. The post shall be embedded into the ground a minimum of 36 inches. This support may be used in both weak and strong soils. The post may be directly embedded or may be embedded in pre-mixed concrete, soilcrete, or approved expanding closed-cell polyurethane foam.
- ❖ Quick-Punch® 14-gauge 2-inch square tubing with 7/16-inch die-cut knockouts on 1-inch centers. This support may be directly embedded a minimum of 48 inches in both weak and strong soils. As an option, an anchor stub may be used. The anchor stub is the next larger size tubing (2-1/4 inch). Additionally, an 18-inch reinforcing sleeve made from the next larger size tubing (2-1/2 inch) may be used. The optional anchor stub, when used, shall be embedded at least 34 inches in strong soils or 55 inches in weak soils with approximately 1 inch protruding above the ground (Figure J-5). Both systems may also be set in concrete, soilcrete, or approved expanding polyurethane foam. No more than 2 posts shall be installed within a 7-foot span.
  - ◆ Unistrut Corporation.
- ❖ Square metal tubing with 7/16-inch holes punched on 1-inch centers. This support may be directly embedded a minimum of 48 inches in both weak and strong soils (Option 1). As an option, an anchor stub may be used. The anchor stub is the next larger size tubing (Option 2). Additionally, an 18-inch reinforcing sleeve made from the next larger size tubing may be used (Option 3). The optional anchor stub, when used, shall be embedded at least 34 inches in strong soils or 55 inches in weak soils with approximately 1 inch protruding above the ground (Figure J-5). Both systems may also be set in concrete, soilcrete, or approved expanding polyurethane foam. The posts may be mounted according to the following table. Any approved sign substrate from Section J.2.d may be used on square metal tubing supports when embedded as per Figure J-5.

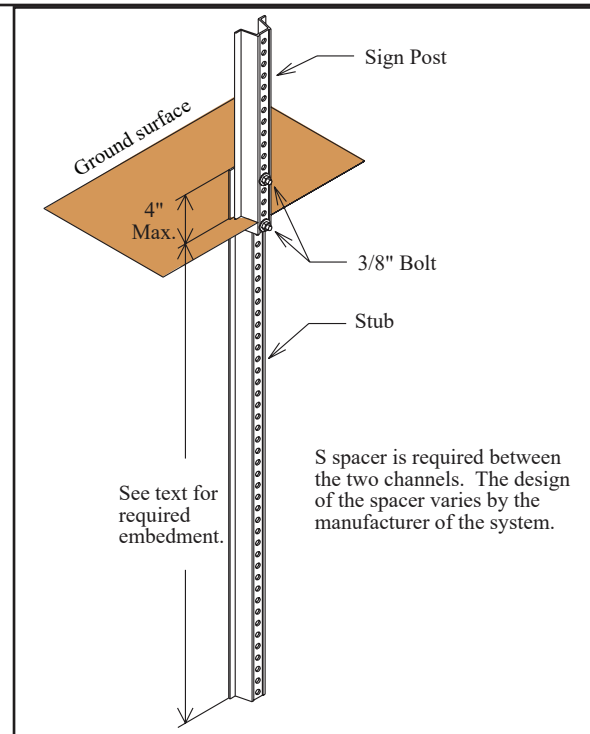
Number of Posts in 7 ft Span	14 Gauge	12 Gauge
1 post (directly embedded)	1-3/4, 2, or 2-1/4 inch	1-1/2, 1-3/4, or 2 inch
2 posts (directly embedded)	1-3/4 or 2 inch	1-1/2 or 1-3/4 inch
1 post (with anchor)	1-3/4, 2, or 2-1/4 inch	1-1/2, 1-3/4, 2, or 2-1/4 inch
2 post (with anchor)	1-3/4 or 2 inch	1-1/2, 1-3/4, or 2 inch
3 post (with anchor)	1-3/4 inch	1-1/2 or 1-3/4 inch

- ◆ Allied Tube and Conduit Corporation.
  - ◆ Centerline Supply, Inc.
  - ◆ Fender Enterprises, Inc.
  - ◆ Maxistrut, Inc.
  - ◆ Northwest Pipe Company.
  - ◆ S-Square Tube Products.
  - ◆ Ultimate Highway Sales, Inc.
  - ◆ Unistrut Corporation
- ❖ Base-bolted sign post system using Franklin Flanged Channel (Figure J-6). Only one 4.0 lb/ft or up to three 2.0, 2.5, or 3.0 lb/ft posts may be installed within a 7-foot span. Posts must be embedded a minimum of 38 inches in strong soil or 60 inches in weak soil. When installed in weak soil, soil plate supplied by manufacturer must be used.
  - ◆ Franklin Industries.



**Figure J-5. Perforated square metal tubing with anchor**

- ❖ S-Q Post Square Slipbase Sign Support System may be installed using the same foundation used by the Texas Triangular Slipbase Sign Support System. Refer to SMD (SLIP-1) or manufacturer recommendations for installation procedures.
  - ◆ Northwest Pipe Company.
- ❖ Fiberglass reinforced plastic (FRP) pipe may be directly embedded or may be anchored with the Universal Anchor System. No more than 2 posts shall be installed within a 7-foot span. The anchor, if used, should be set in concrete or expanding polyurethane foam. Anchor shall protrude no more than 4 inches from the ground. As an option, the post (without the anchor) may be set in concrete, soilcrete, or approved expanding polyurethane foam.
  - ◆ Hwy Com, Inc.
  - ◆ Universal Anchor Systems, L.L.C.
- ❖ Lap Splice™ U-Channel Breakaway System using either 3.0 lb/ft or 4.0 lb/ft Marion Steel Rib-Bak U-Channel Posts (Figure J-6). No more than 3 posts shall be mounted within a 7-foot span. The post shall be embedded into the ground a minimum of 36 inches. This support may be directly embedded in both weak and strong soils, however if the 4.0 lb/ft is used in weak soil, a soil plate must be used.
  - ◆ Marion Steel
- ❖ CP40 composite post, 2-3/8, 2-7/8, or 4 inch outside diameter, manufactured of unsaturated polyester or epoxy resin reinforced with E-glass and filled with a filler material to give the posts a strength equal to that of Schedule 40 steel pipe of equal diameter. Post shall be used only in strong soil and shall be embedded a minimum of 45 inches. No more than 2 posts may be installed in a 7-foot span. Post may be directly embedded or set in concrete, soilcrete, or approved expanding polyurethane foam.
  - ◆ Lancaster Composite
- ❖ NEX™ 12 or 14-gauge 2-inch “octagonal” tubing. This support may be directly embedded a minimum of 36 inches in both weak and strong soils. As an option, an anchor stub may be use. The anchor system utilizes a 2-1/2 inch square tube at least 34.5 inches in length and wedge. This system may also be set in concrete, soilcrete, or approved expanding polyurethane foam. No more than 2 posts shall be installed within a 7-foot span.
  - ◆ S-Square Tube Products
- ❖ Slip Safe™ U-Channel Slip Base System using either 3.0 lb/ft or 4.0 lb/ft Marion Steel Rib-Bak U-Channel Posts mounted as single post or back-to-back post supports. No more than 3 supports shall be mounted within a 7-foot span. This support may be directly embedded in both weak and strong soils, however in weak soil, the post shall be embedded into the ground a minimum of 30 inches and a soil plate must be used.
  - ◆ Marion Steel.
- ❖ Tubing, circular metal, 2-3/8 inches diameter with 0.080 or 0.095 inch wall thickness (a.k.a. thin wall) used with Poz-Loc Wedge and Socket Foundation. Socket may be used as driveable base in strong and weak soil and it may be set in concrete or approved expanding polyurethane foam.
  - ◆ Northwest Pipe Company.
- ❖ Type "L" 14-7/8 x 7-7/8 inch and Type "M" 7-7/8 x 7-7/8 inch Microlam® Laminated Veneer Lumber post with 1-1/4 inch wall thickness. The post shall be weakened by four 1-inch holes drilled through each side of the post that is parallel to the direction of travel. Two holes should be drilled at 18 inches above ground and two more at 3 inches above ground. Each hole of the top pair should be centered either 3 inches or 5 inches from the edge for the Type "M" or the Type "L" post, respectively. Each hole of lower pair should be centered 3 inch from the edge for both posts.
  - ◆ Trus Joist MacMillan.



**Figure J-6. Lap-splice/base bolted anchor**

- ❖ V-Loc™ Socket System - This system may be used to anchor thin-wall round tubing and 2-inch square tubing in standard soil. With an adapter, the anchor can also be used with U-channel. The anchor shall be driven flush with the ground (30-inch embedment depth). The anchor may also be set in concrete or expanding polyurethane foam.
  - ♦ TAPCO - Traffic & Parking Control Co., Inc.
- ❖ Type 2 PCTB Sign Support Assembly. This system uses Schedule 80 pipe to support signs at 7' high by connecting the upright at the connection point between two 30' Type 2 Portable concrete barriers. Necessary details for fabrication of this system are located in Appendix B of this document.

### J.2.c. Removed – See Appendix A

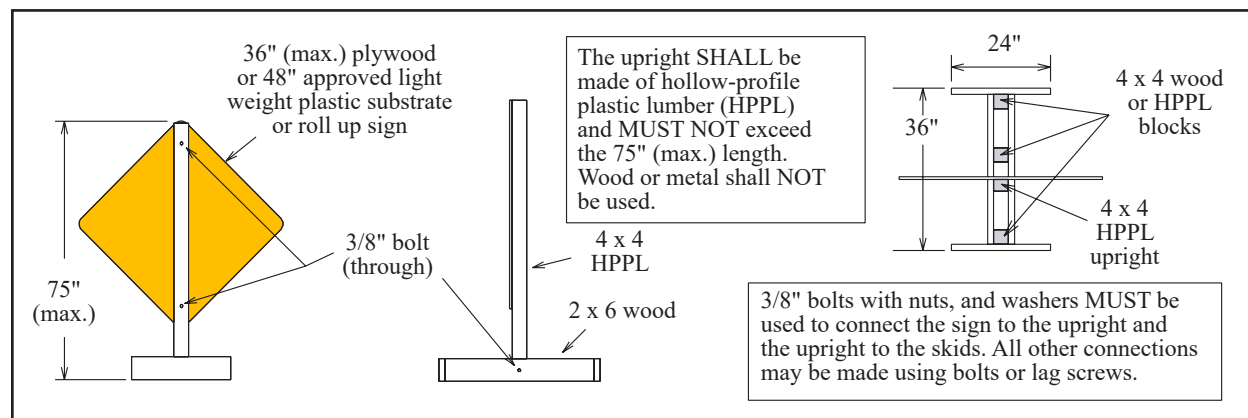
### J.2.d. Substrates for Use on Long-Term / Intermediate-Term Sign Supports

Any of the substrates may be used for Long-term / Intermediate-term supports except where specifically noted or where a manufactured sign support would require user modification to allow the use of the substrate.

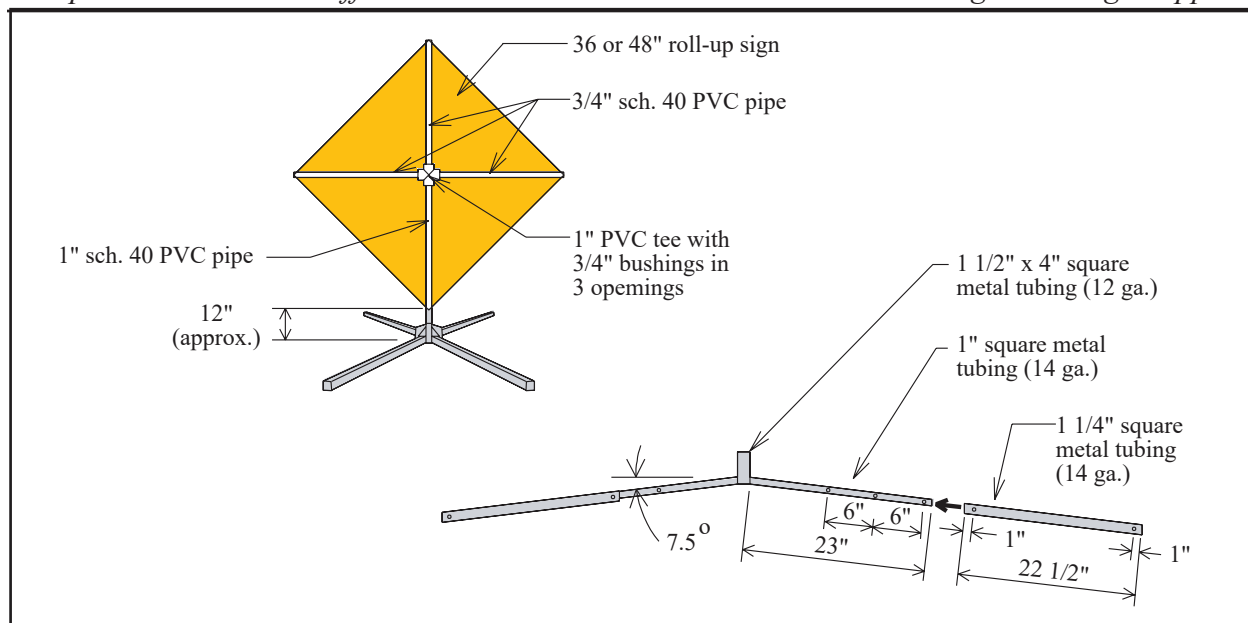
- ❖ Plywood, 1/2" or 5/8" thick. Marine grade, CCA pressure-treated, CDX or similar plywood with water resistant glue. Paint all wood surfaces white if not covered by reflective sheeting. in accordance with
- ❖ Sheet Aluminum conforming to *DMS-7110, Aluminum Sign Blanks*.
- ❖ Roll-Up Signs conforming to *DMS-8310, Flexible Roll-Up Reflective Signs*.
- ❖ Dibond, 2 mm thick composite substrate (Alcan Composites USA)
- ❖ Bone Light ACM, 3mm and 4 mm composite substrate (Bone Safety Signs).
- ❖ Coroplast 10mm and 16mm extruded thinwall fluted plastic sheet (Coroplast, Inc.) (Internal ribs should run perpendicular to support).
- ❖ EcoStrate (E5) Composite traffic sign blanks 0.25" (EcoStrate SFS, Inc.).
- ❖ IntePro® 10mm and 16mm extruded thinwall fluted plastic sheet (Inteplast Group Ltd.) (Internal ribs should run perpendicular to support).
- ❖ InteCell® 13 to 16 mm integral skin expanded foam PVC sheet. (Inteplast Group, Ltd.).
- ❖ Alpolic® composite sign substrate (Mitsubishi Chemical).
- ❖ Endurance™ Sign (Reflexite Corporation).
- ❖ Reynobond PE, 3 to 6 mm thick composite substrate (Reynolds Metal Company).
- ❖ Reynolite, 2 mm thick composite substrate (Reynolds Metal Company).
- ❖ Polyplate® Fiberglass-Reinforced Plastic Sign Panel, 0.135 inches thick. (Sequentia Incorporated).
- ❖ Coro-Lite Corrugated FRP Sign Panel, 0.25 inches thick (US Highway Products).
- ❖ Fiber-Brite Fiberglass-Reinforced Plastic Sign Panel, 0.135 inches thick (US Highway Products).
- ❖ Work Area Protection Part #48SB high-density polyethylene 0.625" thick (Work Area Protection Corp).

## J.3. Short-Term / Short-Duration Work Zone Sign Supports

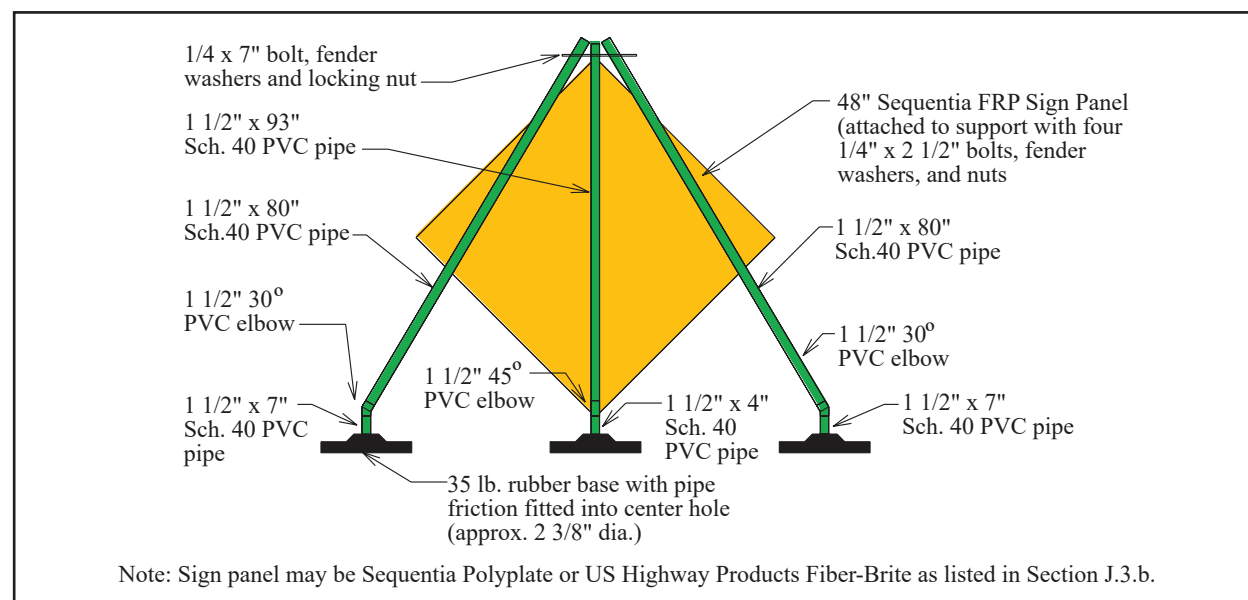
### J.3.a. Short-Term / Short-Duration Portable Sign Supports



**Figure J-7. Wood & HPPL short-term/short-duration H-leg sign support  
(1 foot mounting height)**



**Figure J-8. Barricades Unlimited sign support**



**Figure J-9. JB Witt PVC sign support**

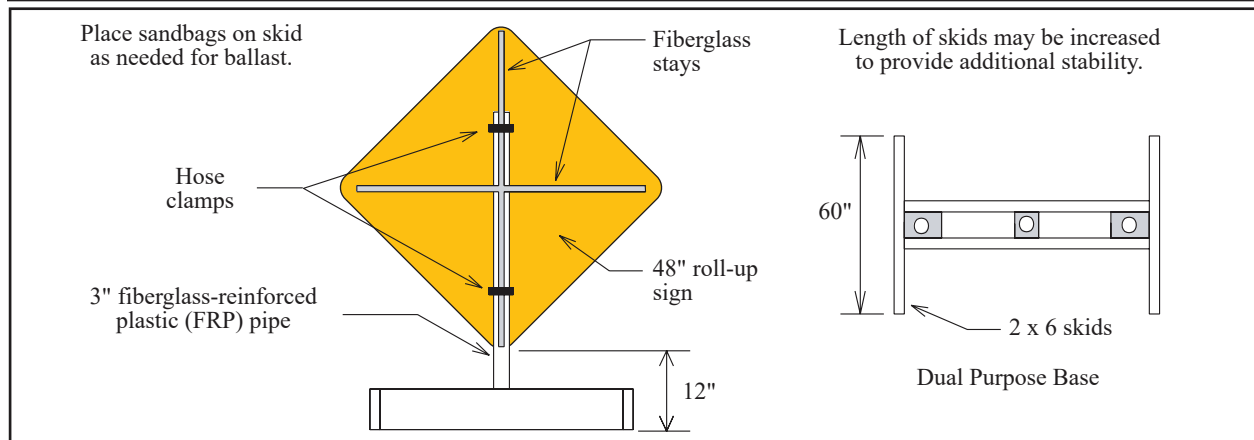
- ❖ H-leg sign support (Figure J-7). This is the only short-term/short-duration sign support for which plywood may be used as a sign substrate. The plywood shall be 36 inches square by 1/2-inch thick.

Slight variations to this support are not considered crashworthy. Strict adherence to the dimensions shown in the drawing below is required.

- ❖ Barricades Unlimited sign support (Figure J-8.)
- ❖ JB Witt PVC sign stand (Figure J-9) with Polyplate (Sequentia) or Fiber-bright (US Highway Products) sign panel.
- ❖ AccuForm Signs
  - ♦ FRC786 Single Spring Tilt-Adjust Roll-up Sign Stand
  - ♦ FRC750 Springless Tilt-Adjust Roll-up Sign Stand
- ❖ Bone Safety Signs
  - ♦ SZ-412 and SZ-412-S Stands for roll-up signs.

- ◆ SZ-412-2S Stand for 48" x 48" x .080" aluminum, 4 mm or thinner aluminum composite material, corrugated plastic, extruded plastic, vinyl roll-up signs.
- ◆ SZ-484 Stand for roll-up signs.
- ◆ SZ-RBS Stand for roll-up signs.
- ❖ Cortina Safety Products.
  - ◆ Quadra Flex V™ Models QFV and QFV-W.
  - ◆ Quadra Lite V™ Models QLV and QLV-W.
- ❖ Dicke Tool Company
  - ◆ DL1000W Stand for roll-up signs.
  - ◆ DL1003W Stand for roll-up signs.
  - ◆ DF3000S Fold & Roll Stand for roll-up signs.
  - ◆ DF3000W Stand for roll-up signs.
  - ◆ DF3003W Stand for roll-up signs.
  - ◆ SDL1000L Stand for roll-up signs.
  - ◆ TF-12C Stand for roll-up signs.
  - ◆ TF-12W Stand for roll-up signs.
  - ◆ TF-18 Stand for 0.080" Aluminum, Endurance, Alpolc and roll-up signs.
  - ◆ UF2000 Stand for roll-up signs.
- ❖ Eastern Metals/USA Sign.
  - ◆ C-102 High Performance Stand for roll-up signs.
  - ◆ C-132 High Performance Stand for roll-up signs.
  - ◆ C-142 High Performance Stand for roll-up signs.
  - ◆ C-200 Steel Super-Flex Compact Stand for roll-up signs.
  - ◆ C-202 Steel Super-Flex Compact Stand for roll-up signs.
  - ◆ C-232 Steel Super-Flex Compact Stand for roll-up signs.
  - ◆ C-242 Steel Super-Flex Compact Stand for roll-up signs
  - ◆ C-301 Steel Compact C- Stand for roll-up signs
  - ◆ C-601 Aluminum Compact C-Stand for roll-up signs.
  - ◆ C-801 Aluminum Compact C-Stand for roll-up signs.
  - ◆ E-350 Econo Stand for Endurance™, 10mm Coroplast, or 10mm IntePro® substrates (see Section J.3.b). (Internal ribs should run perpendicular to support). 2.0mm (.080") aluminum (48" x 48" or smaller), 6.35mm solid ABS plastic (48" x 48" or smaller), 2mm or smaller Alusuisse Dibond, Mitsubishi Alpolc, Reynolds Reynolite or equal AL/LDPE laminated.
  - ◆ E-380 Econo Stand for roll-up signs.
  - ◆ C-902 Aluminum Super-Flex Compact Stand for roll-up signs.
  - ◆ C-942 Aluminum Super-Flex Compact Stand for roll-up signs.
  - ◆ X-501 Aluminum Interstate™ Series Stand for roll-up signs.
  - ◆ X-551 Steel Interstate™ Series Stand for roll-up signs and the Work Area Protection Part #48SB high-density polyethylene 0.625" thick (Work Area Protection Corp.).
  - ◆ X-552 Steel Interstate™ Series Stand for Endurance™, 10mm Coroplast, or 10mm IntePro® substrates (see Section J.3.b), 2.0mm (.080") aluminum (48" x 48", 48" x 60" or smaller), or 2mm AL/LDPE laminated, or Alcan Dibond 2 mm and the Work Area Protection Part #48SB high-density polyethylene 0.625" thick (Work Area Protection Corp.).
  - ◆ X-602 Aluminum Interstate™ Series stand for Endurance™, 10mm Coroplast, or 10mm IntePro® substrates (see Section J.2.d). (Eastern Metals/USA Sign). 48" x 48", 48" x 60" or smaller, 2.0mm (.080") aluminum, 6.35mm solid ABS plastic, 2mm AL/LDPE laminated, Alcan Dibond 2mm or 16mm (5/8") plywood and the Work Area Protection Part #48SB high-density polyethylene 0.625" thick (Work Area Protection Corp.).
  - ◆ X-841 Series X-Stand™ for roll-up signs.
  - ◆ X-842 Series X-Stand™ for Endurance™, 10mm Coroplast, or 10mm IntePro® or Alcan Dibond 2mm substrates (see Section J.3.b.)
  - ◆ MBC-12 and MBC-15 Interstate™ X-Stand Median Barrier Clamp for use with X-501 and X-551 supports above.
- ❖ Impact Recovery Systems, Inc.
  - ◆ IRS® - Part #350 one base portable sign stand with Universal bracket.
- ❖ Hwy Com, Inc.





**Figure J-10. Hwy Com's short-term H-leg sign support (1 foot mounting height)**

- ◆ FRP pipe with dual-purpose base (Figure J-10).
- ❖ Korman Signs, Inc.
  - ◆ SS 1 with roll-up, Alpolic or Alcan Dibond 2mm signs.
  - ◆ SS 548, SS 548 A, SS 548 C, or SS 548 CA with roll-up or Alpolic signs.
  - ◆ SS 548 UC, SS 548 UCR, SS 548 UCA, or SS 548 UCRA with roll-up signs only.
  - ◆ SS548AE, SS548CE, SS548CAE with roll-up or Alpolic signs.
- ❖ Lang Products International, Inc.
  - ◆ Basic™ 36 Portable Traffic Sign Stand.
  - ◆ Basic™ 48 Portable Traffic Sign Stand.
  - ◆ CrossWind™ 204-HD Portable Traffic Sign Stand.
  - ◆ LTT-1 Portable Traffic Sign Stand using ½" thick MDO plywood at a height of 12" to the bottom of the sign.
- ❖ MDI - Marketing Displays International.
  - ◆ 30CAM SteelMaster® Stand for roll-up signs.
  - ◆ 40CAM SteelMaster® Stand for roll-up signs.
  - ◆ 50SM SteelMaster® Stand for roll-up signs.
  - ◆ 4814DLK WindMaster® Stand for roll-up signs.
  - ◆ 4814HDK WindMaster® Stand for roll-up signs.
  - ◆ 4818K WindMaster® Stand for roll-up signs.
- ❖ Plasticade
  - ◆ SS100/SS105 tripod sign stand.
  - ◆ SS300/SS300A springless sign stand.
  - ◆ SS310/SS310A single spring sign stand.
  - ◆ SS340A compact double spring sign stand.
  - ◆ SS410A medium height springless sign stand.
  - ◆ SS420A heavy duty double spring sign stand.
  - ◆ SSRB800 rubber base sign stand.
- ❖ Traffix Devices, Inc.
  - ◆ Econo Buster folding leg sign stand.
  - ◆ Little Buster™ Stand for roll-up signs.
  - ◆ Quad-Drop Sign Stand for roll-up signs.
  - ◆ Step'N Drop Stand for roll-up signs.
  - ◆ Zepher™ Stand for roll-up signs.
- ❖ Work Zone Safety Products
  - ◆ Econo-Brother sign stand for roll-up signs.

**J.3.b. Sign Substrates for Short-Term / Short-Duration Sign Supports**

- ❖ The following substrate may be used with all short-term / short-duration sign supports:
  - ◆ Roll-up signs conforming to DMS-8310, Flexible Roll-Up Reflective Signs.
  - ◆ Coroplast 10mm extruded thinwall fluted plastic sheet (Coroplast, Inc.) (Internal ribs should run perpendicular to support).
  - ◆ IntePro®10mm extruded thinwall fluted plastic sheet (Inteplast Group Ltd.) (Internal ribs should run perpendicular to support).Endurance™ Sign (Reflexite Corporation).
  - ◆ Safe Sign 350 rigid plastic sign panel (TraFFix Devices, Inc.)(Internal ribs should run perpendicular to support).
  
- ❖ The following substrate may be used with short-term/short-duration sign supports. **ONLY**

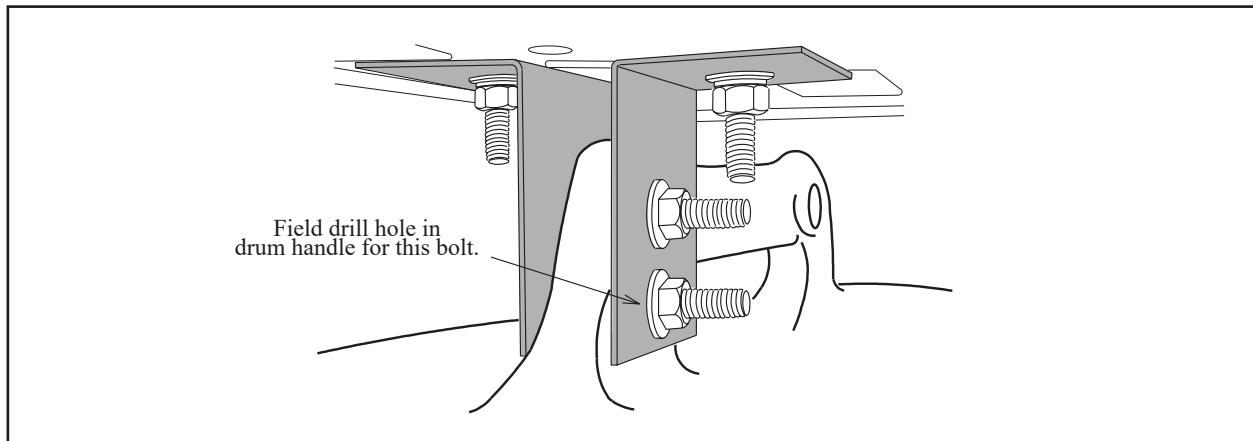
**WHEN NOTED.**

- ◆ Plywood, 1/2-inch thick. Marine grade, CCA pressure-treated, CDX or similar plywood with water-resistant glue. Paint all wood surfaces white if not covered by reflective sheeting.
- ◆ Alpolic® composite sign substrate (Mitsubishi Chemical).
- ◆ Polyplate® Fiberglass Reinforced Plastic Sign Panel, 0.135 inches thick (Sequentia Incorporated).
- ◆ Fiber-Brite sign panel, 1/8-inch thick (U.S. Highway Products).
- ◆ Dibond 2mm composite (Alcan Composites USA.).
- ◆ Bone Light Aluminum Composite Material 3mm or 4 mm (Bone Safety Signs).
- ◆ Sheet Aluminum 0.080" thick conforming to DMS-7110, Aluminum Sign Blanks.

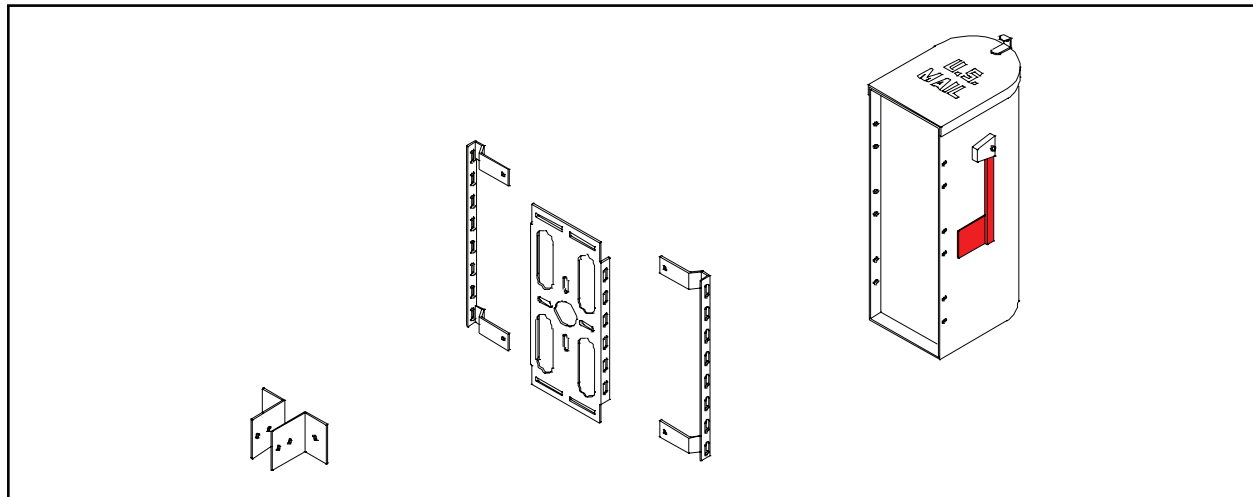
## **K. TEMPORARY MAILBOXES**

❖ Attached to plastic drum as shown on this page and on the Maintenance Division Mail Box (MB) standard drawings. MB Standards can be found on-line at [www.txdot.gov/business/disclaim.htm](http://www.txdot.gov/business/disclaim.htm).

Each temporary mailbox shall be mounted on an approved plastic drum (see Section I). Only one #1, #1½, or #2 mailbox may be installed on any one drum. The mailbox shall be mounted using the standard TxDOT mailbox-mounting bracket in the manner shown in Figures K-1, K-2, and K-3.



**Figure K-1. Mailbox bracket to drum connection detail**



**Figure K-2. Mailbox bracket to mailbox connection detail**

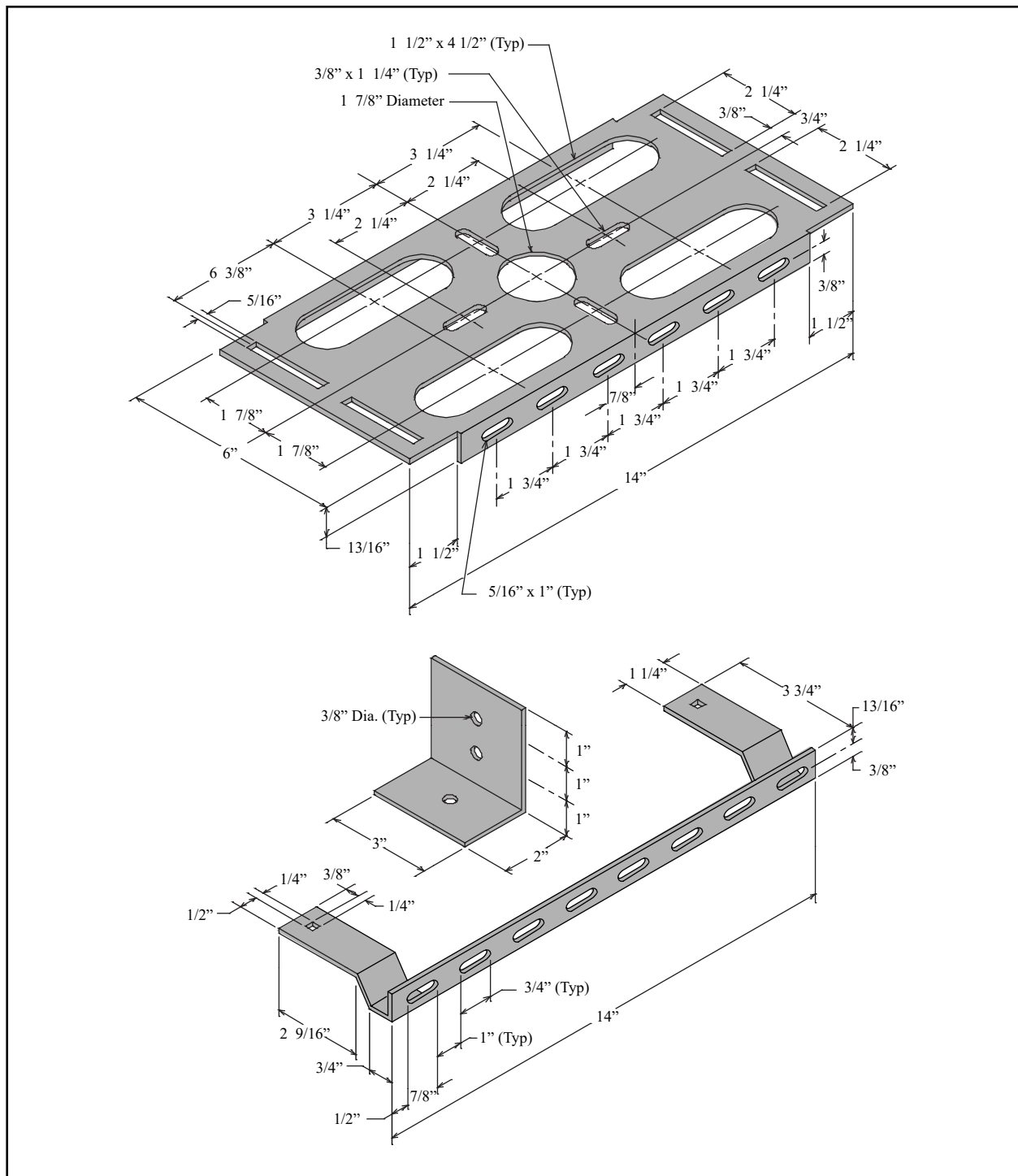
The mounting kit consists of a mounting bracket, two angle brackets, and two bracket extenders. No bracket extenders are required for the #1 mailbox. The #1½ and #2 mailboxes require one and two bracket extenders, respectively. The bracket and components are constructed of 14-gage galvanized steel. Any components whose strength appears to be compromised due to rusting or corrosion shall not be used.

The bracket is attached to the mailbox with six ¼-inch screws with two flat washers and one nut per screw. Screws shall be distributed evenly to maximize the “attached area.”

The bracket extenders are attached to the bracket with two or four 1/4-inch carriage bolts (as required) with a flat washer, a lock washer, and a nut for each bolt.

The angles are attached to the bracket and the drum using 3/8-inch bolts with two flat washers and one nut per bolt.

Bolts and screws shall be of sufficient length so all threads of the corresponding nut are engaged after installation.



**Figure K-3. Mailbox bracket dimensions**

- ❖ Pre-assembled mailbox unit.
  - ◆ IRS® - Part #360 one base temporary mailbox.
- ❖ Temporary mailboxes may be installed on permanent supports as detailed on the Maintenance Division Mail Box (MB) standard drawings. MB Standards can be found on-line at <http://www.txdot.gov/business/disclaim.htm>

## **L. TRUCK-MOUNTED PROTECTIVE DEVICES**

### **L.1. Truck-Mounted Attenuators (TMAs) and Trailer Attenuators (TAs)**

TMAs and TAs used on TxDOT facilities must be NCHRP 350 or MASH compliant. Level 2 compliant TMAs are approved for use only on roadways with regulatory speed limits of 45 mph or less. Level 3 compliant TMAs may be used on any TxDOT facility. The host vehicle for the TMA and TA shall weigh a minimum of 19,000 pounds. \*Host vehicles may be ballasted to achieve the required weight. Any weight added to the host vehicle shall be properly attached or contained within it so that it does not present a hazard, and that proper energy dissipation occurs if the attenuator is impacted from behind by a large truck. The weight of a TA shall not be considered in the weight of the host vehicle but the weight of a TMA may be included in the weight of the host vehicle. Attachment of TMA shall be in accordance with manufacturer's recommendations.

#### ❖ Test Level 3 Compliant

- ◆ U-MAD Cushion 100K Impact TMA (Barrier Systems, Inc.).
- ◆ U-MAD 100k Trailer TA (Barrier Systems, Inc.).
- ◆ Alpha 100K (Energy Absorption Systems, Inc.).
- ◆ SAFE-STOP™ (Energy Absorption Systems, Inc.).
- ◆ SAFE-STOP™ 180 TMA (Energy Absorption Systems, Inc.).
- ◆ SAFE-STOP™ Trailer TA (Energy Absorption Systems, Inc.).
- ◆ Vorteq TL-3 Trailer TMA (Energy Absorption Systems, Inc.).
- ◆ Scorpion TA (17.3' long) (TraFFix Devices, Inc.).
- ◆ TTMA-100 TA (Gregory Industries, Inc.).
- ◆ RAM 100K (Renco, Inc.).
- ◆ Scorpion C 10000 (TraFFix Devices, Inc.).
- ◆ SS90 HD TMA (Valtir, LLC).
- ◆ MPS 350 III TMA (Valtir, LLC).
- ◆ MPS 350 X TMA (Valtir, LLC).
- ◆ Blade TMA (Verdegro USA LLC).
- ◆ SS180M TMA (Valtir, LLC).
- ◆ SMT TA (Valtir, LLC).

#### ❖ Test Level 2 Compliant

- ◆ U-MAD 70k TA (Barrier Systems, Inc.).
- ◆ Alpha 70K (Energy Absorption Systems, Inc.).
- ◆ Ren-Gard 815 (Renco, Inc.).
- ◆ Scorpion A 10000 (TraFFix Devices, Inc.).

### **L.2. Truck-Mounted Barriers**

#### ❖ Test Level 3 Compliant

- ◆ MBT-1 Mobile Barriers Trailer (Mobile Barriers, LLC).

\* Note: The minimum 19,000-pound weight requirement for the host vehicle applies to projects let in January 2018 and later. Projects let prior this may use a host vehicle weight that is recommended by the TMA manufacturer. If the contractor chooses to use a lighter vehicle to mount TMA, then the contractor is responsible for following the TMA manufacturer's recommendations and for being aware of the effects that a lighter vehicle will have on the roll-ahead distance and on the driver of the shadow vehicle.

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## **M. PORTABLE TRAFFIC SIGNALS**

Portable Traffic Signals (PTS) are not required to be NCHRP 350 or MASH compliant at this time. The traffic signals listed below are approved for use on TxDOT facilities based on operational requirements only. Before installing any PTS in a work zone, each location should be:

- 1) Engineered to ensure there is adequate line of sight between the units and any driveway or cross-street within the work zone.
- 2) Field verified to ensure radio communication for proper operation prior to deploying the portable traffic signal.

- ❖ All-Star Traffic Control System - QPB RF 1000 (International Traffic Systems - Texas, Inc.).
- ❖ PTS 2000 portable traffic signal (ADDCO Manufacturing Co.).
- ❖ Horizon SQ3TS (Horizon Signal Technologies).
- ❖ OMJC Pop-up NEMA Wireless Portable Traffic Control Signal Models PNW-234 and QPNW-234 (OMJC Signal, Inc.).
- ❖ OMJC Pop-up LD 2070 Portable Traffic Signal System (OMJC Signal, Inc).
- ❖ OMJC Work Zone MicroForce DC-Portable Traffic Signal System (OMJC Signal, Inc).
- ❖ GEN2-Model PTL 2.4x (North America Traffic, Inc.) for use with 0.6 miles or less distance between units.
- ❖ Ver-Mac TLA-3612 Portable Traffic Signal System (Ver-Mac Signal Technologies, Inc.).
- ❖ STS-PTS-1000A Portable Traffic Signal (Superior Traffic Services).

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## **N. GLARE SCREEN**

Glare screens serve to block the vehicle headlight on cross median barriers for both permanent and temporary applications. They create a visible shield across the barrier. Glare screens also provide delineation for barriers used in the work zone.

- ❖ Carsonite Glare Screen (Carsonite International).
- ❖ SAFE-HIT® Glare Screen System (Safe-Hit Corporation).
- ❖ Plasticade Modular Glare Screen (Plasticade Products).

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## **O. END TREATMENTS FOR CTB**

- ❖ Single Guardrail Terminal
  - ◆ SKT 350 (Road Systems, Inc./Interstate Steel).
  - ◆ ET-2000 Plus (Valtir, LLC).
- ❖ Single Sided Crash Cushion
  - ◆ BEAT-SSCC (Road Systems, Inc./Interstate Steel).
- ❖ Crash Cushion Attenuating Terminal
  - ◆ CATGR (Guardrail or Concrete Barrier) (Valtir, LLC).
- ❖ Brakemaster System Terminal
  - ◆ BRST (Energy Absorption Systems, Inc.).
- ❖ Quadguard II System
  - ◆ QUAD (Narrow or Wide) (Energy Absorption Systems, Inc.).
- ❖ Quadguard Elite System
  - ◆ QGELITE (Narrow or Wide) (Energy Absorption Systems, Inc.).
- ❖ Quest System
  - ◆ Quest (Wide) (Energy Absorption Systems, Inc.).
- ❖ Reusable Energy Absorbing Terminal
  - ◆ REACT 350 (Narrow or Wide) (Energy Absorption Systems, Inc.).
- ❖ Smart Cushion
  - ◆ SMTC (Narrow and Wide) SCI Products Inc./Work Area Protection Corp.
- ❖ Trinity Attenuating Crash Cushion
  - ◆ TRACC (Valtir, LLC).
  - ◆ FASTRACC (Valtir, LLC).
  - ◆ SHORTRACC (Valtir, LLC).
  - ◆ WIDE TRACC (Valtir, LLC).
- ❖ Absorb 350 (water filled).
  - ◆ Absorb 350 (Barrier Systems).
- ❖ TAU-II
  - ◆ TAU-II (Barrier Systems, Inc.).
- ❖ (VIA) Sand Filled Plastic Modules
  - ◆ Energy Absorption Systems.
  - ◆ CrashGard Sand Barrel System (Plastic Safety Systems, Inc.).
- ❖ ACZ 350 System
  - ◆ ACZ (350) (Work zone use only) (Energy Absorption Systems)
- ❖ Hybrid Energy Absorbing Reusable Terminal
  - ◆ HEART (Valtir, LLC)
- ❖ Sentry Longitudinal Energy Dissipater
  - ◆ SLED Crash Cushion (TraFFix Devices)

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## **P. TRAFFIC BARRIERS**

**TL 2 MASH Test Level 2 for roads with speeds  $\leq$  45 mph.**

**TL 3 MASH Test Level 3 for roads with speeds  $>$  45 mph.**

**TL 4 MASH Test Level 4 for roads with speeds  $>$  45 mph.**

### **P.1. Concrete Barriers**

Refer to the Design Division Roadway Standards web page under heading “BARRIERS (RIGID)” for acceptable concrete barrier designs.

### **P.2. Steel Barriers**

The following barriers systems are acceptable for use if requested by a TxDOT district and details of the system are in the plans, signed and sealed by a Texas Professional Engineer.

- ❖ Barrier Systems Inc.
  - ◆ ArmorGuard Movable Steel Barrier (TL 3).
  - ◆ Orion Portable Steel Barrier (TL 3).
- ❖ Energy Absorption Systems
  - ◆ Vulcan Barrier @ Gate System (TL 3).
- ❖ Highway Care
  - ◆ Barrier Guard 800 (TL 3).
- ❖ Hill & Smith, Inc.
  - ◆ Zoneguard (TL 3).
- ❖ Safe Barriers North America, LLC.
  - ◆ Defender Barrier 70 (TL 2).
  - ◆ Defender Barrier 100 LDS (TL 3).
  - ◆ Defender Barrier 100 HC (TL 4).

### **P.3. Water Filled Barriers**

- ❖ Armorcast Products Co.
  - ◆ Guardian Safety Barriers with 350 kit (TL 3).
- ❖ Energy Absorption Systems.
  - ◆ Triton Barrier (TL 2).
  - ◆ Triton Barrier with pedestals (TL 3).
- ❖ Safety Barriers, Inc.
  - ◆ Model SB-1-TL (TL 2).
- ❖ Traffix Devices Inc.
  - ◆ Sentry Water-Cable, Barrier (TL 3).

- ❖ Valtir, LLC.
  - ◆ Yodock 2001 with 350 Rail Kit (TL 3).\*
  - ◆ Yodock 2001M with 350 Rail Kit (TL 2).\*
  - \*Steel reinforcement kits must be installed for product to qualify as a barrier.
- ❖ Valmont Highway
  - ◆ ArmorZone TL-2 Barrier and End Treatment (TL 2).

## **Q. LONGITUDINAL CHANNELIZING DEVICES**

Longitudinal Channelizing devices shall comply with the requirements of the current *Barricade and Construction Standards* (BC Sheets) and the Current *Texas Manual on Uniform Traffic Control Devices* (TMUTCD).

### **Q.1. Longitudinal Channelizing Devices**

(Not designed and should not be used to provide positive protection for obstacles, pedestrians or workers.)

- ❖ Off the Wall Products.
  - ◆ Multi-Barrier Model MB 42x45 LCB (TL 3).
  - ◆ Model MB42x72 JSS LCD (TL 3).
- ❖ Rochester Rotational Molding
  - ◆ 42 x 72 Longitudinal Channelizer (TL2).
- ❖ Safe-Hit Corporation
  - ◆ Barracuda Barricade system (TL 2).
- ❖ Pexco, LLC
  - ◆ TPAR Longitudinal Channelizer (TL 3).
- ❖ Plasticade
  - ◆ ADA Pathcade Barrier System (TL 3).
  - ◆ Strongwall LCD (TL 3).
- ❖ Traffic Safety Service, LLC
  - ◆ TSS-590 Water Barrier Channelizer (TL 3).
- ❖ TrafFix Devices, Inc.
  - ◆ Sentry Water-Cable Barrier (TL 3).
  - ◆ Water Wall (TL 2).
- ❖ Valtir, LLC.
  - ◆ Yodock 2001 (TL 3).
  - ◆ Yodock 2001M (TL 3).
  - ◆ Yodock 2001MB (TL 2).
  - ◆ Yodock 2001SL (TL 2). Not approved for channelizing pedestrians.

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## **R. TEMPORARY RUMBLE STRIPS**

Temporary Rumble Strips shall comply with the requirements of the current *Temporary Rumble Strips (WZ-(RS))* standard. Temporary Rumble Strips are not required on freeways and expressways but may be used based on written direction from the engineer.

Temporary Rumble Strips should not be used when the following conditions exist:

- ◆ Horizontal curves
- ◆ Loose gravel
- ◆ After seal coat has been applied
- ◆ Soft or bleeding asphalt
- ◆ Heavily rutted pavements
- ◆ Unpaved Surfaces

### **R.1. Temporary Rumble Strips**

- ❖ Plastic Safety Systems, Inc.
  - ◆ Roadquake 2 (RQ2) Temporary Portable Rumble Strip
  - ◆ Roadquake 2 Folding (RQ2F) Temporary Rumble Strip.
- ❖ ~~TraFFix Devices, Inc.~~
  - ◆ ~~TraFFix Alert High-Speed Rumble Strip.~~ removed December 10, 2024 due to product recall

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**S. APPENDIX A.**  
**PRODUCTS REMOVED FROM CWZTCD LIST**

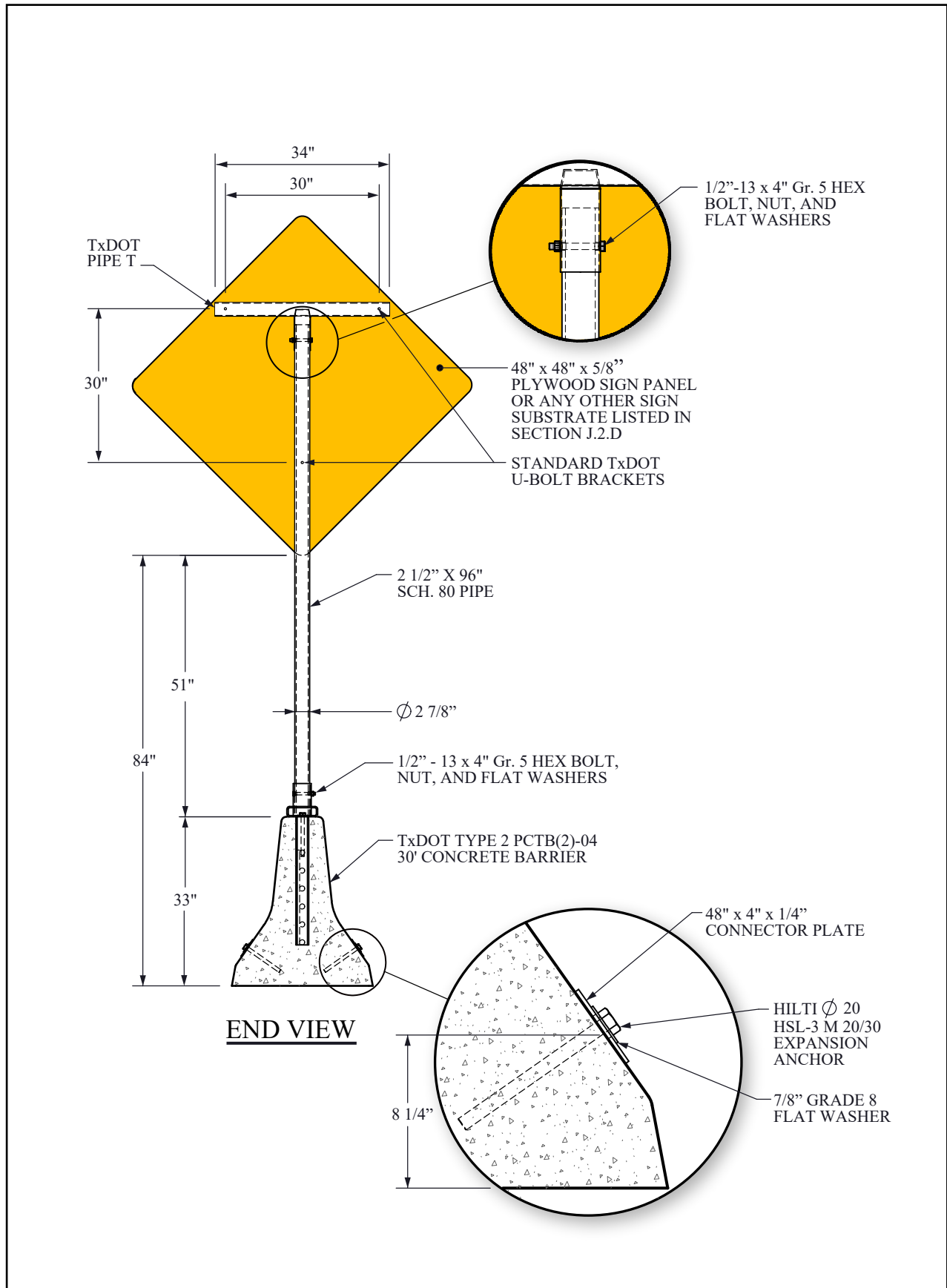
- G. Edgeline Channelizers / Removed 10-22**
- J.2.c. Wheeled Portable Sign Supports / Removed 3-08**
- M. Horizon SQ5 (Horizon Signal Technologies) / Removed 6-09**
- P. Off the Wall Products / Removed 9-12**
  - Multi-barrier Model MB-350 with MB-350 Kit I or Kit II attached (TL 3).

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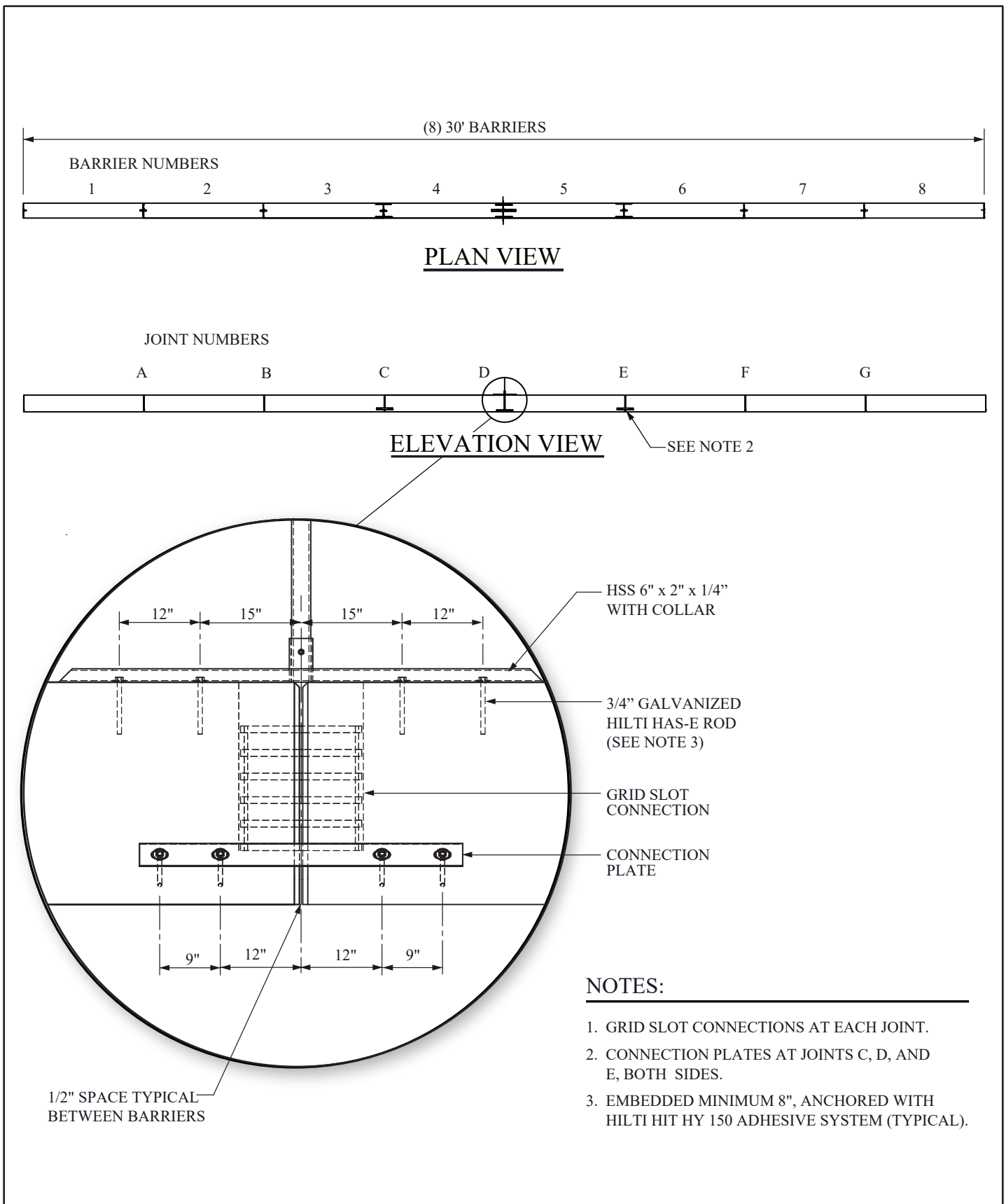
**T. APPENDIX B.**  
**FABRICATION DETAILS**

**Reference in Section J.2.b**

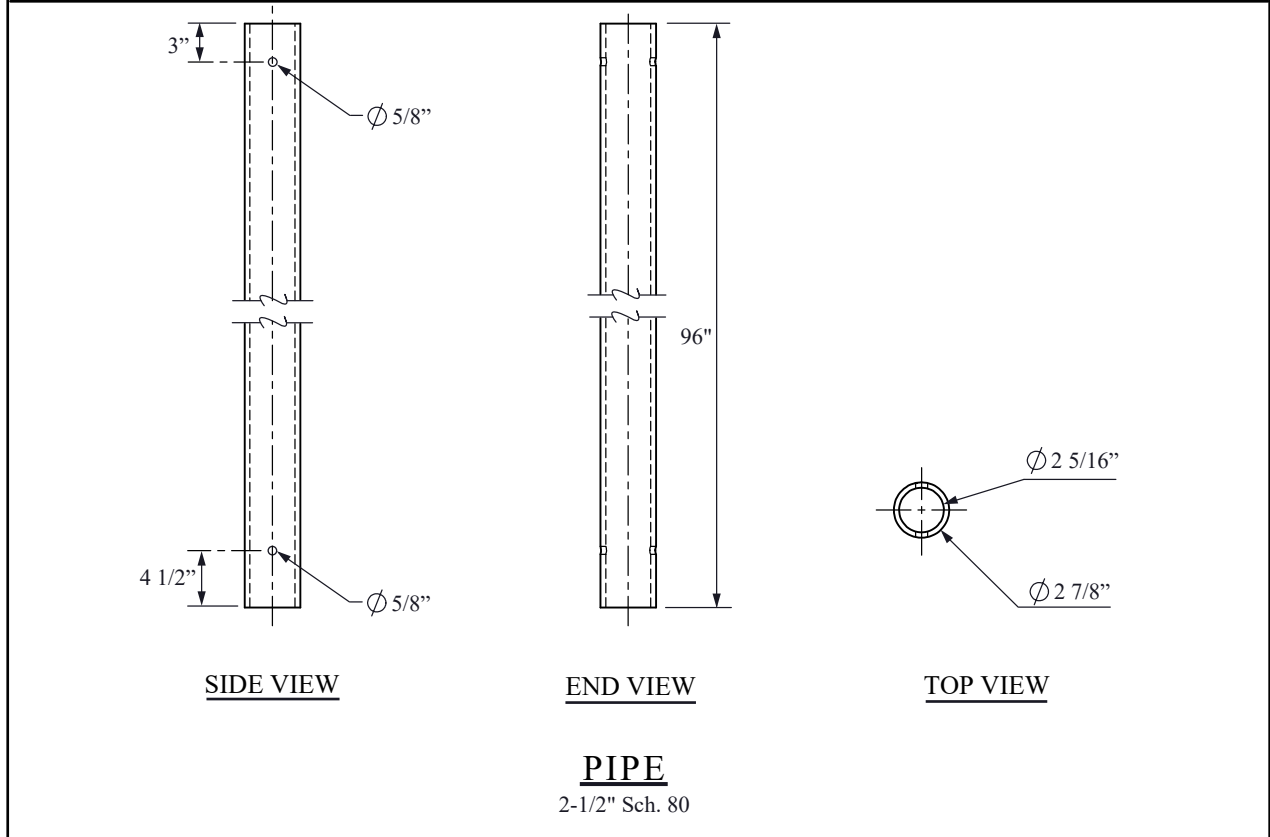
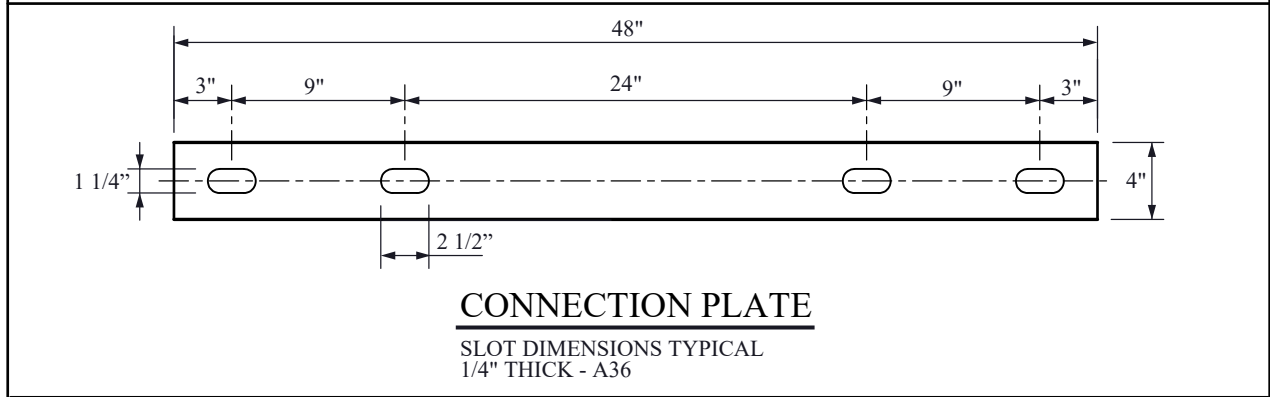
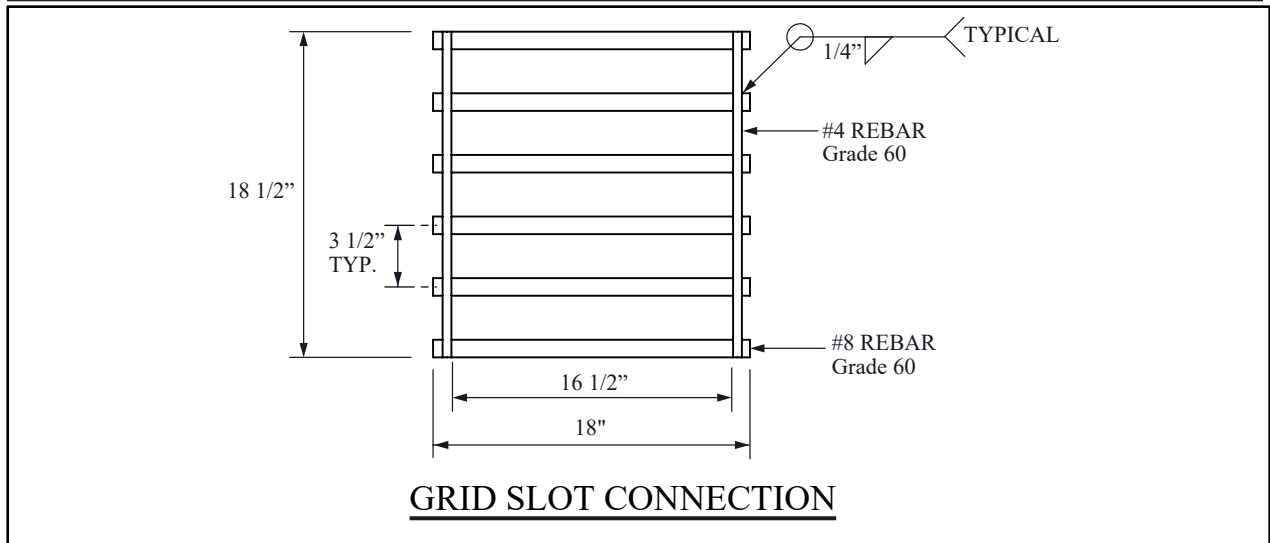
- ❖ Type 2 PCTB Sign Support Assembly



**Type 2 PCTB Sign Support Assembly (1 of 4)**

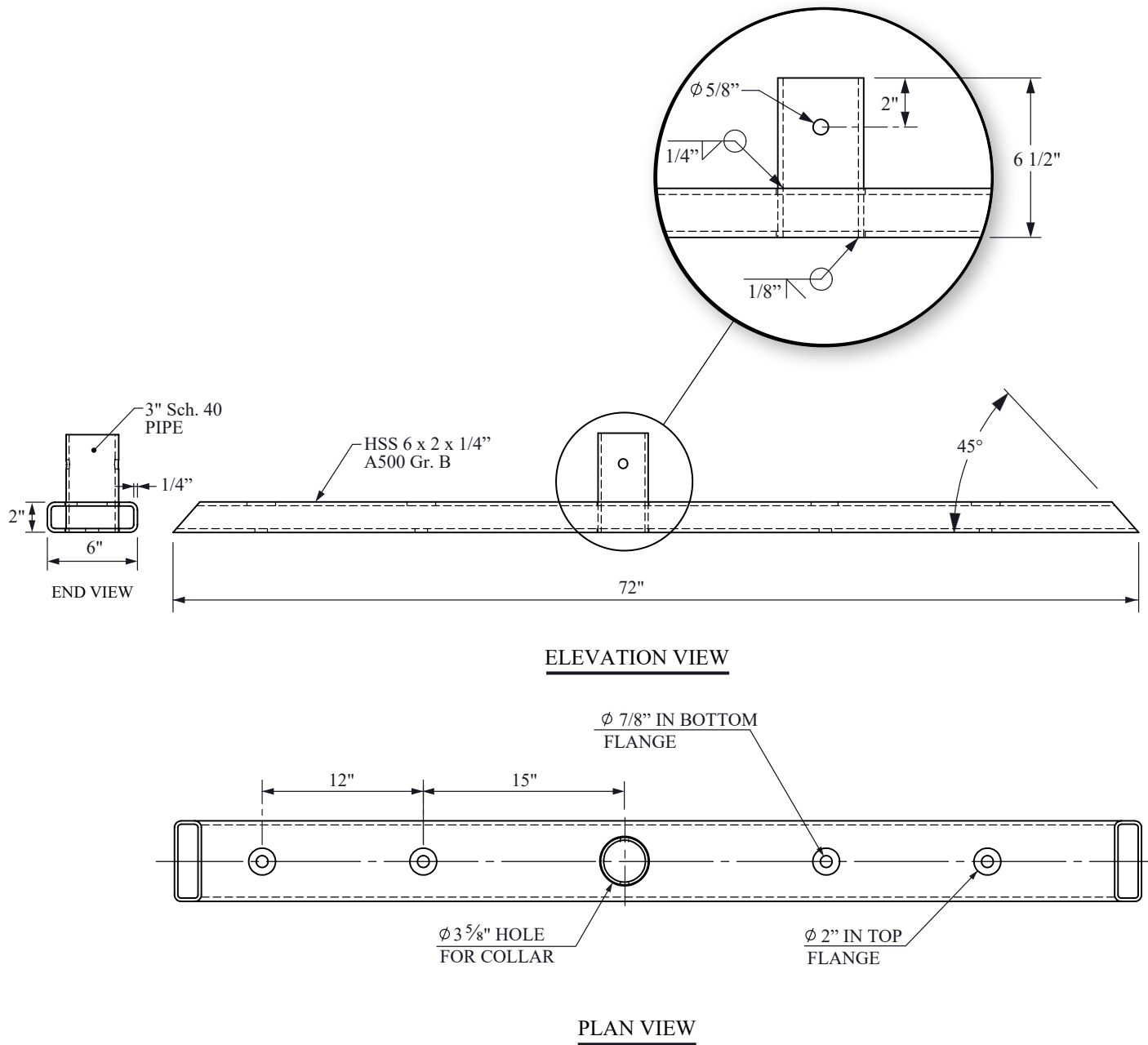


**Type 2 PCTB Sign Support Assembly (2 of 4)**



**Type 2 PCTB Sign Support Assembly (3 of 4)**





**NOTES:**

1. PART IS SYMMETRICAL ABOUT  $\phi$ 's
2. 7/8" AND 2" HOLES TYPICAL.

**TUBING WITH COLLAR**

**Type 2 PCTB Sign Support Assembly (4 of 4)**

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## **U. APPENDIX C.**

### **PRODUCT & INFORMATION SOURCES**

**AccuForm Signs**

16228 Flight Path Dr., Brooksville, FL 34604  
Phone: (866) 377-3119  
Web: [www.accuform.com](http://www.accuform.com)

**ADDCO Manufacturing Co.**

240 Arlington, Ave. E, St. Paul, MN 55117  
Phone: (651) 488-8600  
Fax: (651) 558-3600  
Web: [www.addco.com](http://www.addco.com)

**Aeolian Enterprises**

One Lloyd Avenue Place, Suite 201, Latrobe, PA 15650  
Phone: (412) 539-9460

**Alcan Composites USA Inc.**

P.O. Box 507, Benton, KY 42025  
Phone: (800) 626-33651/(270) 527-4200  
Fax: (270) 527-1552  
Web: [www.alucobondusa.com](http://www.alucobondusa.com)

**Allied Tube and Conduit Corporation**

16100 South Lathrop, Harvey, IL 60426  
Phone: (800) 882-5543  
Web: [www.atc-mechanical.com/telespar](http://www.atc-mechanical.com/telespar)  
E-mail: [telespar@atkore.com](mailto:telespar@atkore.com)

**Armorcast Products Co.**

13230 Saticoy Street, North Hollywood, CA 91605  
Phone: (818) 982-3600  
Fax: (818) 982-7742  
Web: [www.armorcastprod.com](http://www.armorcastprod.com)

**Barrier Systems Inc.**

3333 Vaca Valley Pkwy, Ste. 800, Vacaville, CA 95688  
Phone: (888) 800-3691/(707) 374-6800  
Web: [www.barriersystemsinc.com](http://www.barriersystemsinc.com)

**Bent Mfg. Co. BDAA Inc.**

15442 Chemical Ln, Huntington Beach, CA 92649  
Phone: (888) 842-0600 / (714) 842-0600  
Fax: (888) 842-BENT(2368), (714) 842-2959  
Web: [www.bentmfg.com](http://www.bentmfg.com)  
E-mail: [bmc@bentmfg.com](mailto:bmc@bentmfg.com)

**Bone Safety Signs**

1761 McCoba Drive, Suite A, Smyrna GA 30080  
Phone: (800) 873-2399, (770) 333-1635  
Fax: (770) 333-1639  
Web: [www.bonesafety.com](http://www.bonesafety.com)

**Bufftech**

2525 Walden Ave., Buffalo, NY 14225  
Phone: (800) 333-0569, (716) 685-1600  
Fax: (716) 685-1172  
Web: [www.bufftech.com](http://www.bufftech.com)

**Carsonite International**

P.O. Box 98, Early Branch, SC 22916-0098  
Phone: (800) 223-2083, (803) 943-9115  
Fax: (803) 943-3375

**CenterLine Supply, Inc.**

530 Jesse Street, Grand Prairie, Texas 75051-1141  
Phone: (800) 321-1751, (972) 647-8300  
Fax: (972) 641-1221

**Custom-Pak, Inc.**

86 16th Avenue North  
Clinton, IA 52732  
Phone: (951) 219-6106  
Fax: (563) 249-3163  
Web: [www.traffic-pak.com](http://www.traffic-pak.com)

**Coroplast, Inc.**

4501 Spring Valley Rd., Dallas, TX 75244-3706  
Phone: (800) 806-6116, (972) 392-2241  
Fax: (972) 392-2242  
Web: [www.coroplast.com](http://www.coroplast.com)

**Cortina Safety Products**

10706 Grand Avenue, Franklin Park, IL 60131  
Phone: (847) 455-2800  
Fax: (847) 451-7247  
Web: [www.cortinaco.com](http://www.cortinaco.com)

**Davidson Traffic Control Products**

3110 70th Avenue East, Tacoma, WA 98424-3608  
Phone: (425) 251-8140  
Fax: (425) 251-8303

**Dicke Tool Company**

1201 Warren Avenue, Downers Grove, Illinois 60515  
Phone: (630) 969-0050  
Fax: (630) 969-3973  
Web: [www.dicketool.com](http://www.dicketool.com)  
E-mail: [wayne@dicketool.com](mailto:wayne@dicketool.com)

**Eastern Metals/USA Sign**

1430 Sullivan Street, Elmira, NY 14901  
Phone: (607) 734-2295  
Fax: (607) 734-8783

**EcoStrate SFS, Inc.**

1305 Rocky Canyon Rd.  
Arlington, Tx 76012  
Phone: (646) 715-6894  
Email: hsherga@ecostrate.net  
Web: [www.ecostrate.net](http://www.ecostrate.net)

**Energy Absorption Systems, Inc.**

35 East Wacker Drive Suite 1100, Chicago, IL  
60601-2076 Phone: (888) 323-6374  
Fax: (312) 467-1356, (800) 770-6755  
Web: [www.energyabsorption.com](http://www.energyabsorption.com)

**Fender Enterprises, Inc.**

1332 Azalea Lane, New Braunfels, TX 78130  
Phone: (830) 606-5723  
Jim Kirksey  
121 Idlewild Court, Highland Village, TX 75067  
Phone: (972) 317-4148, Pager: (800) 678-2291  
Fax: (972) 317-0523

**Flasher Flare South East, Inc.**

P.O. Box 15395, Tampa, FL 33684-5395  
Phone: (800) 367-2389, (813) 876-6463  
Fax: (813) 871-2783  
E-mail: kluzinski@ffse.tscs.com

**Franklin Industries**

P.O. Box 671, Franklin, PA 16323  
Phone: (814) 437-3726  
Phone: (606) 263-3628  
Fax: (606) 263-3823

**Gregory Industries, Inc.**

4100 13th Street, SW, Canton, OH 44710  
Phone: (330) 477-4800  
Fax: (330) 477-0626  
Web: [www.gregorycorp.com](http://www.gregorycorp.com)

**Highway Care**

7068 Fire Opal Dr., Las Vegas, NV 89131  
Phone: (702) 204-0732  
Web: [www.highwaycareusa.com](http://www.highwaycareusa.com)

**Hill & Smith, Inc.**

1000 Buckeye Park Rd., Columbus, OH 43207  
Phone: (614) 340-6294  
Fax: (614) 340-6296  
Web: [www.hillandsmith.com](http://www.hillandsmith.com)

**Horizon Signal Technologies**

202 Conestoga Road, Wayne, PA 19087  
Phone: (800) 852 8796

**Hwy Com, Inc.**

P.O. Box 3010, Big Spring, TX 79721-3010  
Phone: (800) 449-9109

**IRS® - Impact Recovery Systems, Inc.**

P.O. Box 12637, San Antonio, TX 78212  
Phone: (210) 736-4477  
Fax: (210) 736-2084

**Inteplast Group Ltd.**

Headquarters  
9 Peach Tree Hill Road, Livingston, NJ 07039  
Phone: (800) 452-2117  
Fax: (800) 889-8807  
Plant: 101 Inteplast Blvd., Lolita, Texas 77971  
Phone: (512) 874-3754  
Fax: (512) 874-3984  
Web: [www.inteplast.com](http://www.inteplast.com)

**International Plastics Corporation**

111 Patton Court, Nicholasville, KY 40356  
Phone: (606) 887-2877

**International Traffic Systems - Texas, Inc.**

P.O. Box 761, Hondo, TX 78661  
Phone: (830) 741-2205  
Fax: (830) 426-5244

**Itasca Plastics**

3750 Ohio Avenue, St. Charles, IL 60174-5438  
Phone: (800) 961-9101, (630) 443-4446  
Fax: (630) 443-8930

**Korman Signs, Inc.**

3027 Lincoln Ave., Richmond, VA 23228  
Phone: (800) 296-6050 / (804) 262-6050  
Web: [www.kormansigns.com](http://www.kormansigns.com)  
E-mail: korman@kormansigns.com

**Lakeside Plastics, Inc.**

P.O. Box 2384, Oshkosh, WI 54903  
Phone: (920) 235-4513  
Fax: (920) 235-6545

**Lancaster Composite**

P.O. Box 247, Columbia, PA 17512-0247  
Phone: (717) 684-4440  
Fax: (717) 684-4445

**Lang Products International, Inc.**

1440 7th Ave., Newport, MN 55055  
Phone: (281) 357-1511  
Fax: (281) 357-1505

**Marion Steel**

912 Cheney Ave., Marion, OH 43301-18011  
Phone: (800) 333-4011, (614) 383-4011  
Fax: (614) 383-6429

**MDI - Marketing Displays International** 38271

W. Twelve Mile Road, Farmington Hills, MI  
48331-3041  
Phone: (800) 521-6776, (248) 553-1900  
Fax: (248) 488-5700  
Web: [www.mdiworldwide.com](http://www.mdiworldwide.com)  
E-mail: [tcpsales@mdiworldwide.com](mailto:tcpsales@mdiworldwide.com)

**MSi - Material Sales International**

3102 S. Roosevelt Street, Tempe, AZ 85282-2008  
Phone: (800) 426-7155, (602) 894-0365  
Fax: (602) 967-6704

**Maxistrut, Inc.**

P.O. Box 70067, Houston, TX 77270-0067  
Phone: (713) 880-4228  
Fax: (713) 868-4550

**Melba Products, Inc.**

584 Francestown Road, Bennington, NH 03442  
Phone: (603) 588-4034  
Fax: (603) 588-8027

**Metro Plastic Barricades**

4417 Winding Creek Ct., Arlington, TX 76016  
Phone: (817) 563-0008

**Mobile Barriers, LLC**

24918 Genesse Trail Rd., Golden, CO 80401  
Phone: (303) 526-5995  
E-mail: [info@mobilebarriers.com](mailto:info@mobilebarriers.com)

**North America Traffic, Inc.**

7 Petersburg Circle, Port Colborne, Ontario,  
Canada L3K 5V4  
Phone: (877) 352-4626  
Web: [www.northamericatrafic.com](http://www.northamericatrafic.com)

**Northwest Pipe Company**

P.O. Box 2002, Houston, TX 77252-2002  
Phone: (800) 369-5009, (713) 863-4300  
Fax: (713) 863-4350

**Off the Wall Products**

P.O. Box 1461, Salt Lake City, UT 84110  
Phone: (801) 363-7740 / (888) 363-7740  
Fax: (801) 363-6372  
Web: [www.multi-barrier.com](http://www.multi-barrier.com)

**OMJC Signal, Inc.**

P.O. Box 1594, Waterloo, IA 50704-1594  
Phone: (800) 776-5999 / (319) 236-0200  
Fax: (319) 236-1554  
Web: [www.omjcsignal.com](http://www.omjcsignal.com)

**PBS, Inc.**

c/o Price Traffic Products  
3810 Harvey Rd., College Station, TX 77845  
Phone: (800) 392-1979, (979) 774-9191  
Fax: (979) 774-9193  
E-mail: [sales@pricetrafficproducts.com](mailto:sales@pricetrafficproducts.com)

**Pexco, LLC**

3110 70th Avenue East, Tacoma, WA 98424  
Web: [www.pexco.com](http://www.pexco.com)

**Plasticade**

7700 Austin Ave., Skokie, Illinois 60077  
Phone: (800) 772-0355, (847) 470-0400  
Fax: (847) 470-0420

**Plastic Safety Systems, Inc.**

P.O. Box 20140, Cleveland, OH 44120  
Phone: (800) 662-6338, (216) 231-8590  
Fax: (216) 231-2702

**Radiator Specialty Company**

P. O. Box 34689, Charlotte, NC 28234-6080  
Richard Brown, National Sales and Marketing  
1900 Wilkinson Boulevard, Charlotte, NC 28208  
Phone: (800) 438-4532, (704) 377-6555  
Fax: (800) 421-9525

**Rad-Tec Fabricators, Inc.**

4810 Rincon Rd., Corpus Christi, TX 78402  
Phone: (361) 883-0831  
Fax: (361) 883-0867  
Web: [www.radtecrubberall.com](http://www.radtecrubberall.com)

**Recycled Plastic Products, Inc.**

1630 W. Evans Unit L, Englewood, CO 80110  
Phone: (800) 235-7940, (303) 975-0033  
Fax: (303) 975-0050  
E-mail: [www.plastifnce@aol.com](mailto:www.plastifnce@aol.com)

**Reflexite Corporation**

120 Darling Drive, Avon, CT 06001-4217  
Phone: (860) 676-7100  
Fax: (860) 676-7199  
Web: [www.reflexite.com](http://www.reflexite.com)

**Renco, Inc.**

P.O. Box 730, Pflugerville, TX 78691-0730  
Phone: (800) 654-8182, (512) 251-2421  
Fax: (512) 251-5411

**Reynolds Metal Company**

P.O. Box 429, Eastman, GA 31023  
Phone: (800) 841-7774

**Rochester Rotational Molding, Inc.**

P.O. Box 205, Rochester, IN 46975  
Phone: (574) 223-0557  
Fax: (574) 223-8303  
Web: [www.rrmplastics.com](http://www.rrmplastics.com)

**S-Square Tube Products**

P.O. Box 306, Commerce City, CO 80037  
Phone: (303) 286-7051, (888) 267-6463  
Fax: (866) 639-5717  
Web: [www.s-squaretube.com](http://www.s-squaretube.com)

**Safe-Hit Corporation**

Division of Energy Absorption Systems, Inc.  
35 East Wacker Drive, Suite 1100, Chicago, IL, 60601  
Phone: (800) 537-8958  
Fax: (800) 770-6755

**Safety Barriers, Inc.**

10519 Lexington Dr, Knoxville, TN 37933  
Phone: (865) 966-1923, (800) 966-2012  
Fax: (865) 675-3622  
Web: [www.safetybarriersinc.com](http://www.safetybarriersinc.com)

**Safe Barriers North America, LLC**

755 Grand Blvd. Suite B 105-227  
Miramar Beach, FL 32550  
Web: [www.safebarriers.com](http://www.safebarriers.com)

**Sequentia Incorporated**

P.O. Box 360530, Cleveland, OH 44136 Phone:  
(216) 238-2400  
Fax: (216) 238-0820

**Service Signing, L.C.**

P.O. Box 158, Cedar Falls, Iowa 50613 Phone:  
(319) 235-9356  
Fax: (319) 235-0960

**Stripes & Stops Co., Inc.**

2323 Greens Rd., Houston, TX 77032  
Phone: (281) 821-3307  
Fax: (281) 821-5680  
Web: [www.stripesandstops.com](http://www.stripesandstops.com)

**Superior Traffic Services**

8404 El Way  
Missoula, MT 59808  
Web: [www.superiortrafficservices.com](http://www.superiortrafficservices.com)

**TAPCO - Traffic & Parking Control Co.,**

Inc. 120 North 120th Street  
Wauwatosa, WI 53226  
Phone: (800) 236-0112, (414) 258-1115  
Fax: (414) 258-2087  
Web: [www.tapconet.com](http://www.tapconet.com)  
E-mail: [tapco@tapconet.com](mailto:tapco@tapconet.com)

**TxDOT****Texas Department of Transportation**

Attn: Standards Engineer, TRF - TE  
125 E. 11th Street, Austin, TX 78701-2483  
Phone: (512) 416-3118  
Fax: (512) 416-3299  
Web: [www.txdot.gov](http://www.txdot.gov)

**Three D Traffic Works, Inc.**

430 North Varney Street, Burbank, CA 91502  
Phone: (877) THE-WRKS, (818) 841-2182  
Fax: (818) 841-5096  
Web: [www.3dplastics.com/tw](http://www.3dplastics.com/tw)

**Traffic Control Systems**

P.O. Box 1111, Beeville, TX 78104  
Phone: (361) 362-2221  
Fax: (361) 362-2223

**Traffic Control Products Group**

2320 N. Central Exwy., Dallas, TX 75204  
Phone: (214) 887-0979  
Fax: (214) 887-0902

**Traffic Safety Service, LLC.**

601 Hadley Road  
South Plainfield, NJ 07080

**TraFFix Devices, Inc.**

220 Calle Pintoresco, San Clemente, CA 92672  
Phone: (949) 361-5663  
Fax: (949) 361-9205  
Web: [www.traffixdevices.com](http://www.traffixdevices.com)

**Transportation Research Board**

National Research Council  
2101 Constitution Avenue, N. W., Washington,  
D. C. 20418  
Web: [www.nas.edu/trb](http://www.nas.edu/trb)

**Trinity Highway Products, LLC**

See *Valtir, LLC*

**Trus Joist MacMillan**

2600 East Amity Road, Boise, ID 83716 Phone:  
(800) 441-4852  
(208) 365-3600

**Ultimate Highway Sales, Inc.**

P.O. Box 548., Chicago Heights, IL 60412-0548  
Phone: (800) 730-4939, (708) 753-0335  
Fax: (708) 753-0336

**Unistrut Corporation**

35660 Clinton Street, Wayne, MI 48184 Phone:  
(800) 521-7730  
Telespar Product Manager  
4929 Blalock, Houston, TX 77041  
Phone: (800) 242-1912, (713) 690-1652  
Fax: (713) 690-2335  
Web: [www.unistrut.com](http://www.unistrut.com)  
E-mail: unistrut@interaccess.com

**Universal Anchor Systems, LLC**

P.O.Box 3010, Big Spring, TX 79721-3010  
Phone: (800) 449-9109

**US Highway Products, Inc.**

American Fiber Technologies Division  
407 Brookside Road, Waterbury, CT 06708  
Phone: (800) 883-8363  
Fax: (203) 755-9158

**Utility Structural Systems**

11515 Counselor, Houston, TX 77065  
Phone: (800) 367-9273, (713) 991-1145  
Fax: (281) 890-6913

**Valmont Highway**

57-65 Airids Road, Minto, NSW, 2566, Australia  
Phone: +61 2 98273353  
Fax: +61 2 98273300  
Web: [www.valmonthighway.com](http://www.valmonthighway.com)

**Valtir, LLC**

15601 Dallas Parkway, Suite 525  
Addison, TX 75001  
Web: [www.valtir.com](http://www.valtir.com)

**Verdegro USA LLC**

888 Biscayne Blvd, Suite 505, Miami, FL 33132  
Phone: (786) 408-5709  
Fax: (786) 431-3097  
E-mail: [www.sales@verdegro.com](mailto:www.sales@verdegro.com)

**Ver-Mac Signal Technologies, Inc.**

1781 Rue Bresse, Quebec, QC G2G 2V2, Canada  
Phone: (888) 488-7446, (418) 654-1303  
Fax: (418) 654-0517  
Web: [www.ver-mac.com](http://www.ver-mac.com)

**Western Highway Products, Inc.**

10650 Fern Ave., Stanton, CA 90680  
Phone: (714) 761-4811  
Fax: (714) 952-2118  
Web: [www.westernhighway.com](http://www.westernhighway.com)  
E-mail: whpsales@westernhighway.com

**Work Area Protection Corporation**

2500 Production Dr. - P.O. Box 4087, St. Charles,  
IL 60174-9081  
Phone: (800) 327-4417, (630) 377-9100  
Fax: (630) 377-9270  
E-mail: workarea@workareaprotection.com

**Work Zone Safety Products, Inc.**

7201 Haven Ave., Suite E, Rancho Cucamonga,  
CA 91701  
Phone: (909) 266-1453  
Web: [www.workzonesafetyproducts.com](http://www.workzonesafetyproducts.com)

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