



**STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION**

ROADWAY DESIGN DIVISION
SUITE 1200 JAMES K. POLK BUILDING
505 DEADERICK STREET
NASHVILLE, TENNESSEE 37243-3848
(615) 741-2221

CLAY BRIGHT
COMMISSIONER

BILL LEE
GOVERNOR

INSTRUCTIONAL BULLETIN NO. 21-13

**Regarding Various Revised and New Standard Drawings
Includes Chapter 5 Update**

Effective December 10, 2021 letting (September 29, 2021 Turn-in), the following Standard Drawings have been revised and are new. In addition, Chapter 10 of the Roadway Design Guidelines - Index of Standard Drawings and the web site have been updated accordingly and are available online. In addition, the Roadway Design Guidelines Chapter 5 section 205.00 Cable Barriers has been updated based on the new Cable Barrier Standard Drawings.

New Standard Drawings:

10-106.00 SAFETY DESIGN AND GUARDRAILS

10-106.02 CABLE BARRIER

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-CB-2		HIGH TENSION CABLE BARRIER
S-CB-3		CABLE BARRIER ANCHOR DETAILS
S-CB-3A		CABLE BARRIER ANCHOR BRACKET DETAILS
S-CB-4		CABLE BARRIER ANCHOR POST #2 DETAILS
S-CB-5		CABLE BARRIER LINE POST DETAILS

Revised Standard Drawings:**10-100.00 ROADWAY DESIGN STANDARDS****10-100.03 RD11 TYPICAL SECTIONS AND DESIGN CRITERIA**

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RD11-TS-5W	06-15-21	TYPICAL DETAILS FOR INSIDE LANE WIDENING OF FREEWAYS

10-104.00 ROADWAY, PAVEMENT APPURTENANCES, AND FENCES**10-104.02 INTERSECTIONS**

DRAWING NUMBER	REVISION DATE	DESCRIPTION
RP-D-15	06-15-21	DETAILS OF STANDARD CONCRETE DRIVEWAYS
RP-D-16	06-15-21	DETAILS OF LOWERED STANDARD CONCRETE DRIVEWAYS

10-106.00 SAFETY DESIGN AND GUARDRAILS**10-106.01 CLEAR ZONE AND SAFETY PLANS**

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-PL-3	06-16-21	SAFETY PLAN MINIMUM INSTALLATION AT BRIDGE ENDS
S-PL-6	06-15-21	SAFETY PLAN SAFETY HARDWARE PLACEMENT ON OUTSIDE EDGE

10-106.04 GUARDRAIL DETAILS

S-GR31-1	06-15-21	GUARDRAIL DETAILS
S-GR31-1C	06-15-21	GUARDRAIL GENERAL NOTES AND POST DETAILS

10-106.05 GUARDRAIL CONNECTIONS

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-GRC-4	06-15-21	GUARDRAIL CONNECTION TO BRIDGE RAILING CONCRETE PARAPET
S-GRC-6	06-15-21	GUARDRAIL CONNECTION TO BRIDGE ENDS FOR LOW SPEED ROADWAYS

10-106.06 GUARDRAIL (SPECIAL CASES)

DRAWING NUMBER	REVISION DATE	DESCRIPTION
-----------------------	----------------------	--------------------

S-GRS-1	06-15-21	SPECIAL CASE LONG SPAN GUARDRAIL 1 POST, 2 OR 3 POSTS OMITTED
S-GRS-2	06-15-21	SPECIAL CASE GUARDRAIL ATTACHMENT TO CONCRETE DECKS
S-GRS-5A	06-15-21	WEAK-POST GUARDRAIL ASSEMBLY DETAILS FOR TYPE 1 & 2

10-106.08 GUARDRAIL ANCHORS

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-GRA-3	06-15-21	TYPE 13 GUARDRAIL ANCHOR

10-106.09 CONCRETE MEDIAN BARRIERS

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-SSMB-9	06-15-21	SINGLE SLOPE BARRIER WALL FOR GRADE SEPARATED MEDIAN

10-106.10 GUARDRAIL MAINTENANCE

DRAWING NUMBER	REVISION DATE	DESCRIPTION
S-GR28-1M	06-15-21	W-BEAM & THRIE BEAM BARRIER RAIL AND RUB RAIL DETAILS

10-107.00 DESIGN-TRAFFIC CONTROL**10-107.01 PAVEMENT MARKINGS**

DRAWING NUMBER	REVISION DATE	DESCRIPTION
T-M-4A	06-15-21	STANDARD UNSIGNALIZED MID-BLOCK CROSSING
T-M-4B	06-15-21	STANDARD SIGNALIZED MID-BLOCK CROSSING
T-M-6	06-15-21	MARKING DETAIL FOR EXPRESSWAY AND FREEWAY INTERCHANGES
T-M-9	06-15-21	PAVEMENT MARKING AND SIGNING DETAILS FOR RAMP INTERSECTIONS
T-M-18	06-15-21	FLEXIBLE DELINEATOR DETAILS

10-108.00 EROSION PREVENTION AND SEDIMENT CONTROL**10-108.02 SLOPE DEVICES**

DRAWING NUMBER	REVISION DATE	DESCRIPTION
EC-STR-3B	06-15-21	SILT FENCE

These standard drawings are located on the web site and in Chapter 10 of the Design Guidelines and can be found in the following links.

Standard Drawings:

<https://www.tn.gov/content/tn/tdot/roadway-design/standard-drawings-library/standard-roadway-drawings.html>

Chapter 10 - Index of Standard Drawings is available online at this location:

https://www.tn.gov/content/dam/tn/tdot/roadway-design/documents/design_guidelines/DG-C10.pdf

Chapter 5 Update

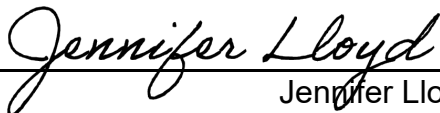
5-205.00 CABLE BARRIERS

Cable barrier systems are typically installed at existing four lane divided highways with traversable depressed medians wider than minimum clear zone distance. Cable barriers may be used to mitigate locations experiencing the severe run-off-the-road left crash density or as an improved safety measure, to reduce crash severity. Cable barriers are designed to perform for impacts on either side; thus, only one run may be installed on recoverable, 4:1 or flatter fill slopes. High tension cable barrier consists of three or four high tension steel cables supported by steel posts. Cable barriers require an anchor to provide the tension, as well as, savage type fittings to adjust and maintain tension for the system to perform under the desired performance criteria. At the point of impact, cable barriers typically deflect up to 11 ft. In order to maintain maximum 10 ft deflection performance from a cable barrier system, the installed length shall not exceed 5000 ft from anchor to anchor with maximum 11ft post spacing and initial tension as shown on Standard Drawing S-CB-2 Table B. Because of the deflection, cable barriers are not suited to shield objects close to the roadway or narrow medians. If proposed at these locations, use a reduced post spacing to limit the deflection rates.

The performance of high tension cable barrier systems depends on soil specific design of the anchoring system. Cable Barrier Terminals should not be included in the length of need since they do not offer re-directive capacity, but they are designed to be crashworthy. Terminals should be overlapped by another barrier system, if continuous barrier protection is needed while transitioning from one hardware type to the other. Shorter runs of cable barrier systems that overlap are advantageous to maintain tension across critical areas. See Roadway Standard Drawing Series S-CB for cable barrier installation guidance.

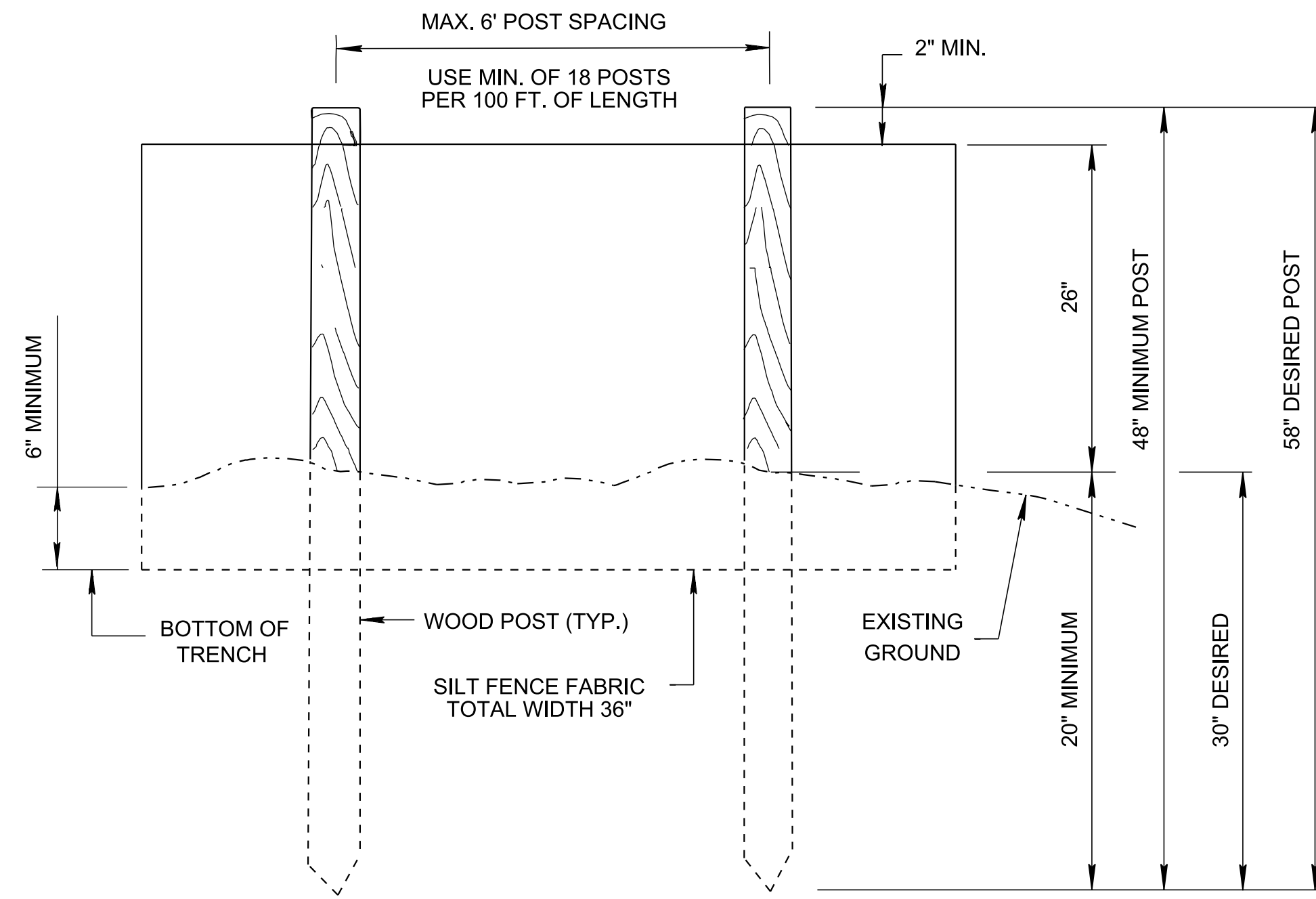
Chapter 1 has been updated on the website at this link:

https://www.tn.gov/content/dam/tn/tdot/roadway-design/documents/design_guidelines/DG-C5.pdf

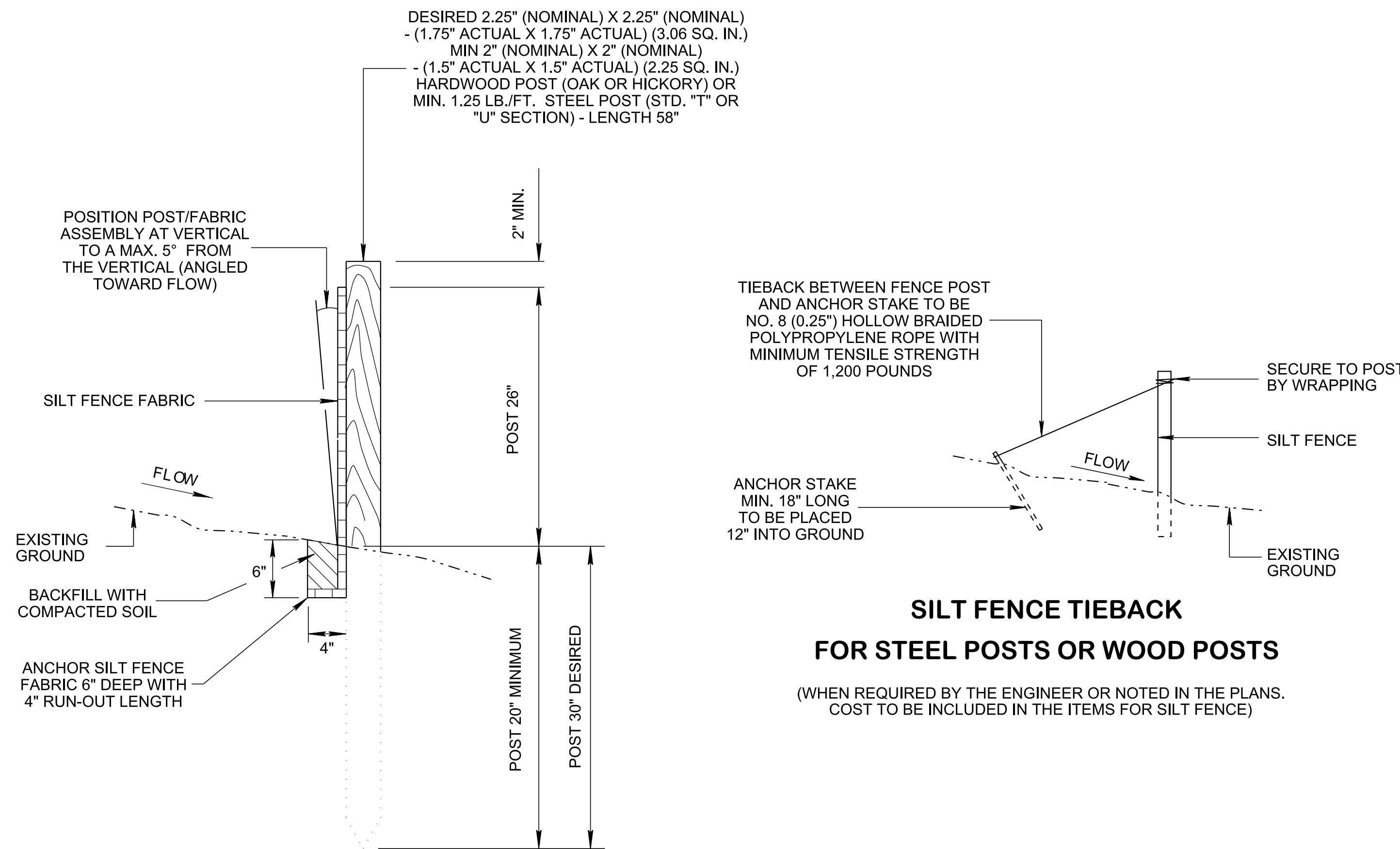

Jennifer Lloyd, PE
Civil Engineering Director
Roadway Design Division

KJL:ARH:RBB
August 10, 2021

6/16/2021 9:22:51 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings\Standard Roadway Drawings - CURRENT\In Progress\10-108.00 Erosion Prevention and Sediment Control\IP180.02 Slope Devices\IP180-STR-3B-2



ELEVATION VIEW



SECTIONAL VIEW

SILT FENCE TIEBACK FOR STEEL POSTS OR WOOD POSTS

(WHEN REQUIRED BY THE ENGINEER OR NOTED IN THE PLANS. COST TO BE INCLUDED IN THE ITEMS FOR SILT FENCE)

EROSION CONTROL PLAN LEGEND: * SF * SF * SF * SILT FENCE

NOT TO SCALE

SILT FENCE FABRIC SPECIFICATIONS	
FABRIC PROPERTY AND TEST METHODS	REQUIRED PHYSICAL PROPERTIES (MARV VALUES OF TEST DATA)
GEOTEXTILE FABRIC TYPE	WOVEN SLIT FILM (PER AASHTO M288)
APPARENT OPENING SIZE (ASTM D4751)	#30 TO #70 STANDARD SIEVE
WATER FLUX (ASTM D4491)	≥ 4 GPM/FT ²
TENSILE STRENGTH (ASTM D4632)	≥ 120 LB. (WARP DIRECTION) X 100 LB. (FILL DIRECTION)
ULTRAVIOLET STABILITY (AFTER 500 HRS PER ASTM D4355)	≥ 70%
ELONGATION (ASTM D4632)	≤ 20% (MAX)
BURST STRENGTH (ASTM D3786)	≥ 250 PSI
PUNCTURE STRENGTH (ASTM D4833)	≥ 60 LB.
TRAPEZOIDAL TEAR (ASTM D4533)	≥ 50 LB. (WARP DIRECTION) X 40 LB. (FILL DIRECTION)

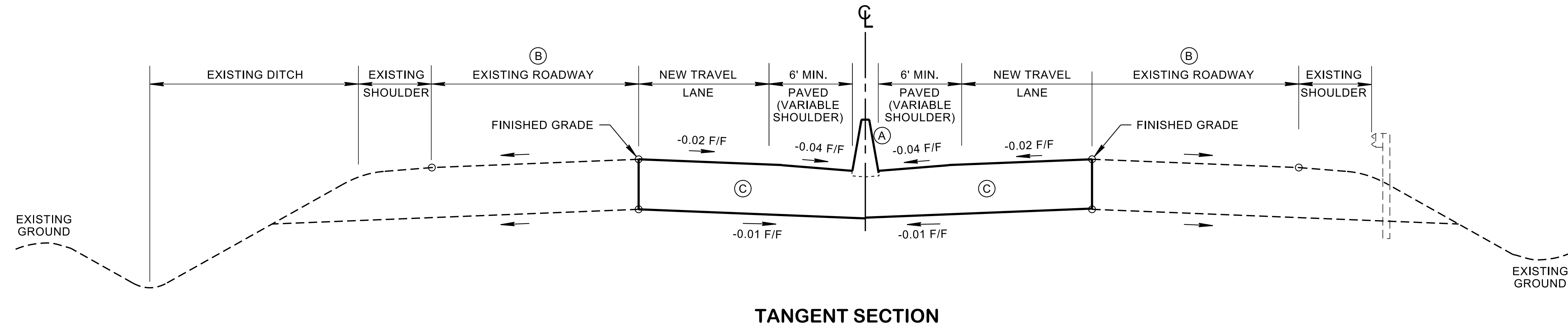
SILT FENCE GENERAL NOTES

- (A) SILT FENCE IS USED TO INTERCEPT SMALL AMOUNTS OF SEDIMENT AND REDUCE VELOCITY FROM SHEET FLOW ONLY. DO NOT USE IT ADJACENT TO NATURAL WATER RESOURCES (WETLANDS OR STREAMS) OR ACROSS CONCENTRATED FLOW PATHS.
- (B) THE MAXIMUM DRAINAGE AREA SIZE FOR A CONTINUOUS BARRIER SHALL BE 1/4 ACRE PER 100 LINEAR FEET OF FENCE LENGTH UP TO A MAXIMUM DRAINAGE AREA OF 2 ACRES. MAXIMUM SLOPE LENGTH BEHIND FENCE ON UPSLOPE SIDE SHALL BE 110 FEET (AS MEASURED ALONG THE GROUND SURFACE).
- (C) WHEN INSTALLED AT THE TOE OF A SLOPE, SILT FENCE SHOULD BE PLACED 5 FEET TO 7 FEET AWAY FROM THE TOE TO ALLOW SPACE FOR PONDING OF WATER, COLLECTION OF SEDIMENT, AND EASE OF MAINTENANCE AND REMOVAL.
- (D) WHEN TWO SECTIONS OF SILT FENCE FABRIC ADJOIN EACH OTHER THEY SHALL BE JOINED ACCORDING TO THE DETAILS ON STANDARD DRAWING EC-STR-3E.
- (E) MAINTENANCE SHALL BE PERFORMED AS NEEDED; CAPTURED SOIL MATERIAL SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE AND/OR OTHER EVIDENCE OF FILTER CLOGGING IS OBSERVED.
- (F) STEEL POSTS SHALL BE ROLLED FROM HIGH CARBON STEEL AND SHALL HAVE A MINIMUM WEIGHT OF 1.25 LB/FT. POSTS SHALL BE HOT-DIPPED GALVANIZED OR PAINTED WITH HIGH GRADE WEATHER RESISTANT STEEL PAINT. STEEL POSTS SHALL BE EQUIPPED WITH AN ANCHOR PLATE HAVING A MINIMUM AREA OF 14 SQUARE INCHES. POSTS SHALL BE STUDDED, EMBOSSED, OR PUNCHED TO AID IN THE ATTACHMENT OF THE WIRE BACKING. POSTS AND ANCHOR PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A702.
- (G) WHEN STEEL POSTS ARE USED THEY SHALL HAVE A PROJECTION FOR FASTENING WIRE TO THEM. THE WIRE FASTENERS SHOULD BE EVENLY SPACED WITH AT LEAST FIVE PER POST.
- (H) IF THE FILTER MATERIAL IS STAPLED TO THE WOODEN STAKES, HEAVY DUTY WIRE STAPLES WITH ONE-HALF INCH LENGTH AND 1 INCH WIDTH SHALL BE USED AND EVENLY SPACED WITH AT LEAST FOUR PER POST. SILT FENCE FABRIC SHALL NOT BE STAPLED TO TREES.
- (I) SILT FENCES SHOULD BE PLACED ALONG OR NEAR THE GROUND CONTOUR. THE BOTTOM OF FENCE AT GROUNDLINE SHOULD BE ON A ZERO PERCENT (0%) GRADE, PLUS OR MINUS FIVE TENTHS OF ONE PERCENT (0.5%). THE ENDS OF A ROW OF SILT FENCE SHOULD BE TURNED UPSLOPE FORMING A J-HOOK TO FILTER ANY CONCENTRATED FLOW BEHIND FENCE.
- (J) A PREASSEMBLED SILT FENCE MEETING THE REQUIREMENTS OF THIS DRAWING IS ACCEPTABLE IN LIEU OF A FIELD CONSTRUCTED SILT FENCE.
- (K) STATIC SLICING IS THE PREFERRED METHOD OF FENCE INSTALLATION. STATIC SLICING INVOLVES THE INSERTION OF A NARROW CUTTING BLADE, PLACED AT THE SPECIFIED ANCHOR DEPTH FOR THE GIVEN FABRIC AS SHOWN ON THE APPLICABLE DETAIL, AND SIMULTANEOUSLY PULLING THE FENCE FABRIC INTO THE TRENCH AS THE TRENCH IS BEING EXCAVATED. ALTERNATE TRENCH-BASED METHODS ARE ALSO ACCEPTABLE. DO NOT USE EQUIPMENT THAT WILL DISTURB WIDER THAN 4" IN-SITU SOIL SUCH AS BACKHOE. FOR TRENCH-BASED INSTALLATIONS, SILT FENCING SHALL BE INSTALLED PER THE FOLLOWING STEPS AND IN THE FOLLOWING ORDER:
 - EXCAVATE TRENCH A MAXIMUM OF 4 INCHES WIDE AND 6 INCHES DEEP. THE TRENCH SHALL BE HAND-CLEANED FOLLOWING EXCAVATION TO REMOVE BULKY DEBRIS SUCH AS ROCKS, STICKS, AND SOIL CLODS FROM THE TRENCH.
 - INSTALL FABRIC IN TRENCH.
 - BACKFILL TRENCH (OVER-FILL) WITH SOIL PLACED AROUND FABRIC.
 - COMPACT SOIL BACKFILL WITH MECHANICAL EQUIPMENT. DO NOT DAMAGE THE FABRIC DURING COMPACTION (DAMAGED FABRIC SHALL BE REPLACED).
 - DRIVE AND SET SUPPORT POSTS PER SPACING REQUIREMENTS GIVEN ON THE APPLICABLE FENCE DETAIL. FOR PRE-ASSEMBLED SILT FENCE, DRIVE SUPPORT IN TO GROUND FIRST, FOLLOWED BY FABRIC PLACEMENT IN TRENCH.
 - ATTACH FABRIC TO THE POSTS USING WIRE TIES OR STAPLES. SPACING AND DENSITY OF TIES OR STAPLES SHALL BE INSTALLED AS DESCRIBED IN NOTES (G) AND (H).
- (L) ONLY SILT FENCE FABRIC LISTED ON THE QUALIFIED PRODUCTS LIST MAY BE USED. ANY PRODUCTS LISTED ON THE QUALIFIED PRODUCTS LIST AS AN APPROVED ALTERNATE MAY ALSO BE USED.
- (M) SILT FENCE SHALL BE PAID FOR UNDER ITEM NUMBER 209-08.03 TEMPORARY SILT FENCE (WITHOUT BACKING) PER LINEAR FOOT. PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION, MAINTENANCE, AND REMOVAL OF THE SILT FENCE.
- (N) SEDIMENT SHALL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE STRUCTURE AND PAID FOR UNDER ITEM NUMBER 209-05, SEDIMENT REMOVAL PER CUBIC YARD.

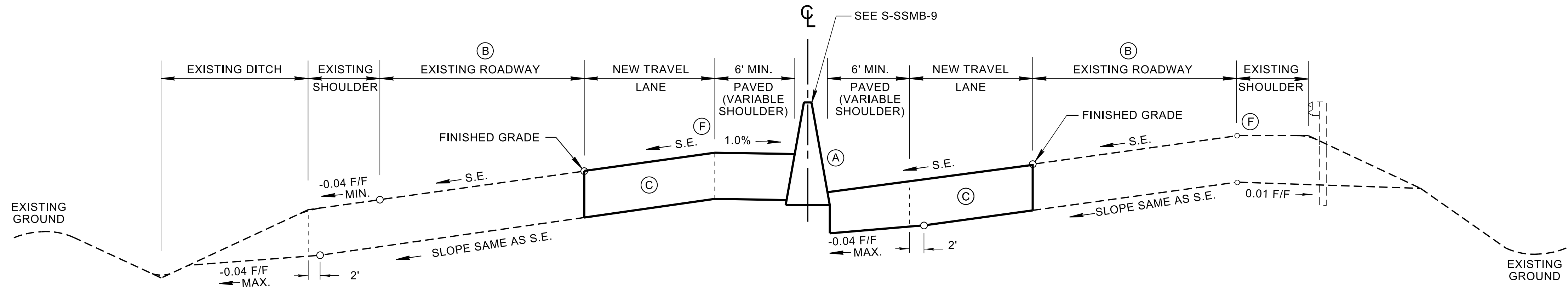
REV. 12-18-03: MODIFIED TABLE (1) AND GENERAL NOTE (E)
REV. 7-29-04: CHANGED VALUES IN TABLE (1) FROM MEAN TO MARV VALUES.
REV. 4-15-06: REMOVED POA SPECS. FROM TABLE (1). ADDED NOTE (L). REVISED TABLE TITLE. REORDERED GENERAL NOTES. REFORMATTED SHEET. REVISED NOTES, MISC. EDITS TO DRAWING.
REV. 4-1-08: REMOVED TEMPORARY REFERENCE, REVISED NOTES, AND MISC. EDITS TO DRAWING.
REV. 8-1-12: MINOR EDITS TO GENERAL NOTES.
REV. 3-16-17: CHANGED SECOND NOTE (M) TO NOTE (N).
REV. 05-01-20: ADDED AASHTO REFERENCE IN TABLE, UPDATED GENERAL NOTES (K) AND REDREW SHEET.
REV. 06-15-21: ADDED ALTERNATE POST SIZE AND REVISED POST EMBEDMENT LENGTH.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SILT FENCE



TANGENT SECTION



SUPERELEVATION SECTION

PURPOSE

THIS STANDARD DRAWING MAYBE USED WHEN UTILIZING THE EXISTING DEPRESSED MEDIAN TO ADD EITHER A TRUCK CLIMBING LANE, AN AUXILIARY LANE OR AN ADDITIONAL NEW LANE.

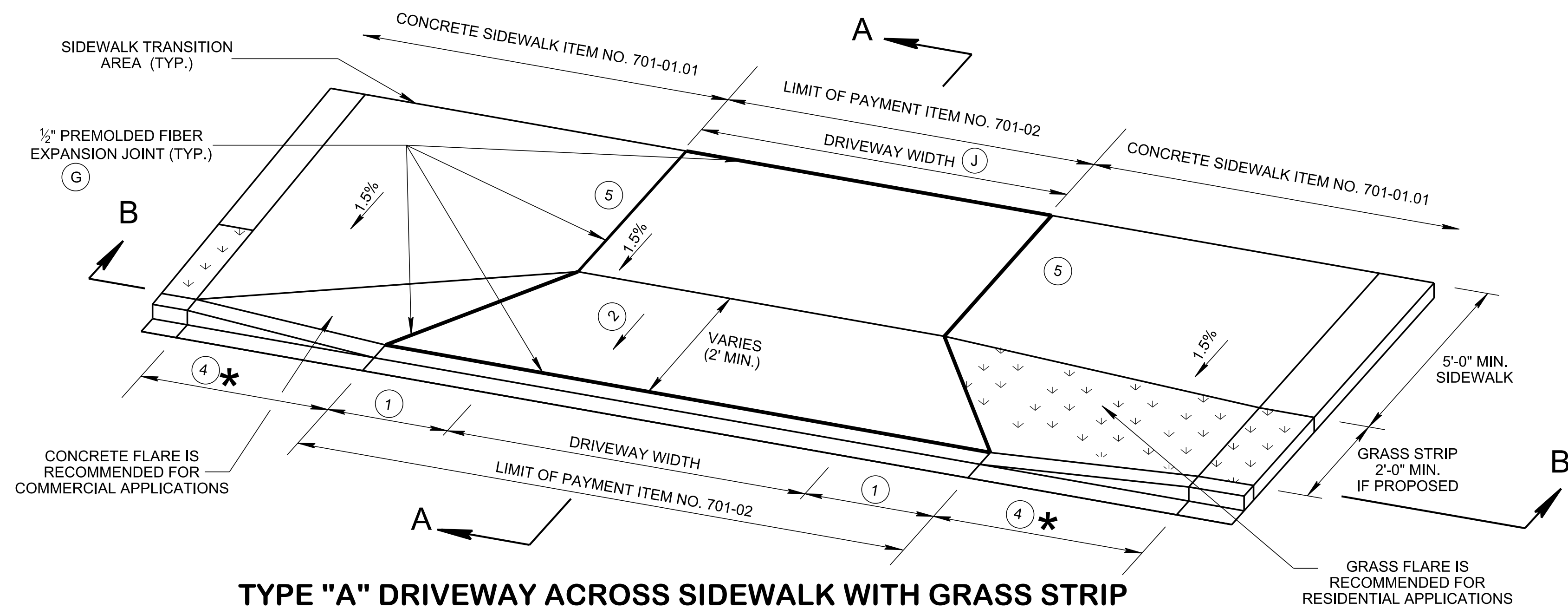
DESIGN NOTES

- (A) SEE STANDARD DRAWING S-SSMB SERIES FOR BARRIER WALL DETAILS.
- (B) EXISTING LANES TO REMAIN IN PLACE UNLESS OTHERWISE SPECIFIED.
- (C) EXISTING INSIDE SHOULDERS REQUIRE FULL DEPTH REMOVAL UNLESS OTHERWISE SPECIFIED.
- (D) GRADES ONE PERCENT STEEPER THAN THE VALUE SHOWN MAY BE USED FOR EXTREME CASES IN URBAN AREAS WITH RIGHT-OF-WAY CONSTRAINTS OR WHERE NEEDED IN MOUNTAINOUS TERRAIN.
- (E) ALTHOUGH THE SELECTED DESIGN SPEED ESTABLISHES THE LIMITING VALUES OF CURVE RADIUS AND MINIMUM SIGHT DISTANCE THAT SHALL BE USED IN DESIGN, THERE SHALL BE NO RESTRICTION ON THE USE OF FLATTER HORIZONTAL CURVES OR GREATER SIGHT DISTANCES WHERE SUCH IMPROVEMENTS CAN BE PROVIDED AS A PART OF AN ECONOMICAL DESIGN (SEE PAGE 2-55).
- (F) THE SLOPE OF THE SHOULDER AND THE ROADWAY PAVEMENT SHOULD NOT EXCEED AN ALGEBRAIC DIFFERENCE OF 7%.
- (G) PAGE NUMBERS REFERRED TO ON THIS DRAWING ARE FROM "A POLICY OF GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AASHTO, 2011 (GREEN BOOK), UNLESS OTHERWISE NOTED.

TABLE I FREEWAY - DESIGN STANDARDS (E)

DESIGN STANDARDS (FOR GIVEN DESIGN SPEED)	DESIGN SPEEDS (MPH)					(G)	
	50	55	60	65	70		
MINIMUM RADIUS (FT.) 0.08 MAX. S.E.	758	960	1200	1480	1810	SEE PAGE 3-32	
MINIMUM STOPPING SIGHT DISTANCE (FT.)	425	495	570	645	730	SEE PAGE 3-4	
MINIMUM "K" VALUE	CREST VERTICAL CURVE	84	114	151	193	247	SEE PAGE 3-155
	SAG VERTICAL CURVE	96	115	136	157	181	SEE PAGE 3-161
MAXIMUM GRADES % (D)	LEVEL TERRAIN	4	4	3	3	3	SEE PAGE 8-4
	ROLLING TERRAIN	5	5	4	4	4	
	MOUNTAINOUS TERRAIN	6	6	6	5	5	
FOR SUPERELEVATION SEE STANDARD DRAWINGS RD11-SE SERIES							
FOR INSIDE SHOULDER SEE STANDARD DRAWINGS RD11-TS-5 AND RD11-SE-3A							

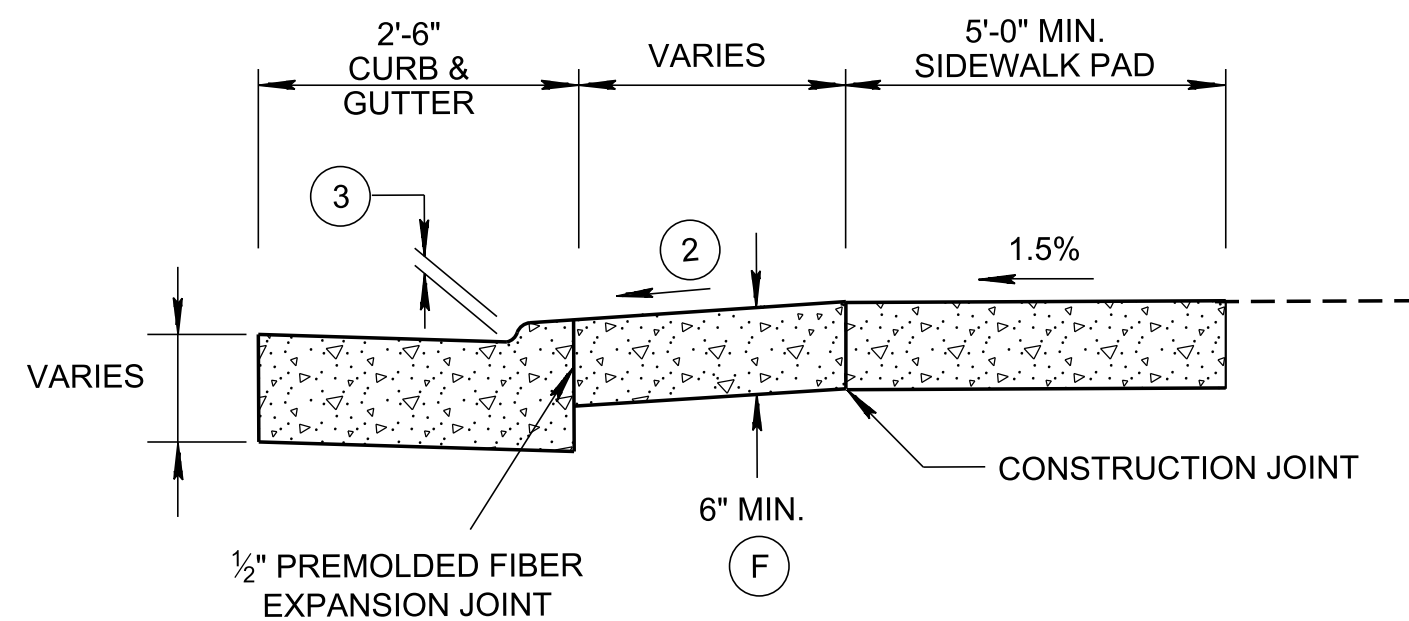
7/16/2021 7:49:55 AM
 P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-104.00 Roadway, Pavement Appurtenances and Fence IP\104.02 Intersections IP\RPD15-



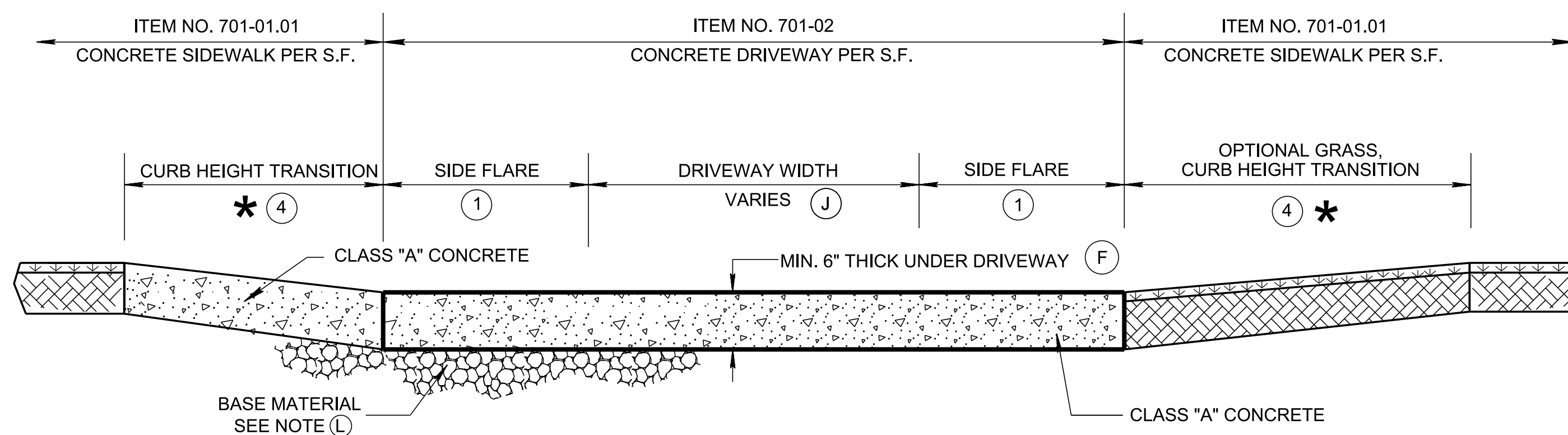
TYPE "A" DRIVEWAY ACROSS SIDEWALK WITH GRASS STRIP

LEGEND

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE.



SECTION A-A



SECTION B-B

FOOTNOTES	
①	SIDE FLARE WIDTH SHOULD BE A MINIMUM 7'-0" FOR COMMERCIAL DRIVEWAYS. SIDE FLARE WIDTH SHOULD BE A MINIMUM 3'-6" FOR RESIDENTIAL DRIVEWAYS.
②	DRIVEWAY RAMP GRADE VARIES, 15% MAX. (10% RECOMMENDED) APRON GRADE FOR RESIDENTIAL DRIVEWAYS. 8% MAX. (5% RECOMMENDED) APRON GRADE FOR COMMERCIAL DRIVEWAYS.
③	HEIGHT OF LOWERED CURB SHALL BE 2.25 INCHES. SEE STD DWG RP-VC-10 & RP-VC-11.
④	THE SLOPE OF THE SIDEWALK AND/OR CURB HEIGHT TRANSITION VARIES TO A MAXIMUM OF 8.33% LENGTH OF TRANSITION IS RELATIVE TO THE LONGITUDINAL ROADWAY GRADE.
⑤	COMMERCIAL DRIVEWAY ENTRANCE TYPICALLY (MAX. 40' WIDE) MAY REQUIRE DETECTABLE WARNING SURFACES IF ENTRANCE SERVES MORE THAN 400 VEHICLES PER DAY. SEE STD. DWG. NOS. MM-CR- SERIES FOR DETAILS.
⑥	3R PROJECTS MAY REQUIRE SLOPE CORRECTION, PARALLEL CROSS-WALK MARKINGS (ESPECIALLY AT TWO WAY DRIVEWAY ENTRANCES), AND DETECTABLE DOME SURFACE TO MAINTAIN CONTINUITY AT COMMERCIAL DRIVE ENTRANCES. ADDITIONAL SIGNS (WATCH FOR PED) MAY BE ADDED AT DRIVEWAYS BY THE DIRECTION OF AN ENGINEER IF NEEDED.

GENERAL NOTES																
(A)	THIS TYPE OF DRIVEWAY IS PREFERRED OVER THE LOWERED TYPE AS SHOWN ON RP-D-16 BECAUSE THE ELEVATION OF THE SIDEWALK REMAINS A CONSTANT FOR PEDESTRIANS.															
(B)	5'-0" MINIMUM SIDEWALK WITH A MAXIMUM CROSS SLOPE OF 1.5% THROUGH DRIVEWAYS.															
(C)	DESIGNER TO CHECK GUTTER FLOW DEPTH AT DRIVEWAY LOCATIONS TO ASSURE THAT THE DESIGN FLOW DOES NOT OVERTOP THE SIDEWALK AREA. IF OVERTOPPING OCCURS, PLACE AN INLET AT THE UPSTREAM SIDE OF THE DRIVEWAY OR PERFORM OTHER DESIGN MITIGATION.															
(D)	THE SLOPE OF THE LANDING AREA SHALL NOT EXCEED 1.5% IN THE SIDEWALK AREA.															
(E)	DRIVEWAYS TO BE BUILT COMPLETE OR IN PART AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.															
(F)	ALL DRIVEWAYS TO BE 6" UNIFORM THICKNESS, UNLESS OTHERWISE SHOWN ON PLANS.															
(G)	EXPANSION JOINTS ARE TO BE PLACED AS INDICATED ON THE PLANS. WHEN THE BACK OF THE DRIVEWAY ABUTS AGAINST A CONCRETE DRIVEWAY OR BUILDING, AN ADDITIONAL EXPANSION JOINT WILL BE PLACED AT THAT LOCATION.															
(H)	THE ROADWAY DESIGNER SHALL CONSIDER THE USE OF A CATCH BASIN ON EITHER SIDE OF THE DRIVEWAY. CAREFUL CONSIDERATION TO THE PLACEMENT OF CATCH BASINS SHALL BE TAKEN IF THE DRIVEWAY IS IN A VERTICAL SAG CURVE.															
(I)	PAY ITEMS:															
	<table border="0"> <tr> <td>ITEM NO: 303-01,</td> <td>MINERAL AGGREGATE, TYPE A BASE, GRADING D,</td> <td>PER TON.</td> </tr> <tr> <td>ITEM NO: 701-01.01,</td> <td>CONCRETE SIDEWALK (4"),</td> <td>PER S.F.</td> </tr> <tr> <td>ITEM NO: 701-02,</td> <td>CONCRETE DRIVEWAY,</td> <td>PER S.F.</td> </tr> <tr> <td>ITEM NO: 701-02.02,</td> <td>CONCRETE DRIVEWAY (8"),</td> <td>PER S.F.</td> </tr> <tr> <td>ITEM NO: 702-03,</td> <td>CONCRETE COMBINED CURB AND GUTTER,</td> <td>PER C.Y.</td> </tr> </table>	ITEM NO: 303-01,	MINERAL AGGREGATE, TYPE A BASE, GRADING D,	PER TON.	ITEM NO: 701-01.01,	CONCRETE SIDEWALK (4"),	PER S.F.	ITEM NO: 701-02,	CONCRETE DRIVEWAY,	PER S.F.	ITEM NO: 701-02.02,	CONCRETE DRIVEWAY (8"),	PER S.F.	ITEM NO: 702-03,	CONCRETE COMBINED CURB AND GUTTER,	PER C.Y.
ITEM NO: 303-01,	MINERAL AGGREGATE, TYPE A BASE, GRADING D,	PER TON.														
ITEM NO: 701-01.01,	CONCRETE SIDEWALK (4"),	PER S.F.														
ITEM NO: 701-02,	CONCRETE DRIVEWAY,	PER S.F.														
ITEM NO: 701-02.02,	CONCRETE DRIVEWAY (8"),	PER S.F.														
ITEM NO: 702-03,	CONCRETE COMBINED CURB AND GUTTER,	PER C.Y.														
(J)	TYPICAL DRIVEWAY WIDTHS ARE 12' (14' TWO WAY) FOR RESIDENTIAL AND 24' (40' MAX.) FOR COMMERCIAL. REFER TO SECTION 5 (ACCESS DESIGN) IN THE MANUAL FOR CONSTRUCTING DRIVEWAY ENTRANCES ON STATE HIGHWAY (2015).															
(K)	ALL SIDEWALKS SHALL HAVE A MINIMUM CONCRETE THICKNESS OF 4". THE SIDEWALK TRANSITION THICKNESS IS DEPENDENT UPON THE DRIVEWAY AND SIDEWALK THICKNESSES. THE COST OF THE SIDEWALK TRANSITION WILL BE INCLUDED IN THE PAY ITEM NO. OF 701-01.01.															
(L)	MINIMUM 4" MINERAL AGGREGATE BASE MATERIAL ITEM NO. 303-01 SHALL BE INSTALLED UNDER NEW CONCRETE DRIVEWAYS. SITE SPECIFIC PAVEMENT DESIGN MAY BE REQUIRED FOR COMMERCIAL DRIVEWAYS USED AS A DELIVERY ACCESS AS WELL. A DRIVEWAY PAVEMENT DESIGN WITH 6" CONCRETE PAVEMENT AND 4" AGGREGATE DEPTH MAY BE LIMITED TO LIGHT COMMERCIAL VEHICULAR TRAFFIC.															

REV. 7-15-08: UPDATED SIDEWALK DIMENSIONS.

REV. 4-8-16: ADDED ITEM NUMBERS. UPDATED SLOPES AND DIMENSIONS. UPDATED NOTES.

REV. 07-16-18: ADDED NOTES TO CONC. FLARE AND GRASS FLARE IN ISOMETRIC VIEW. ADDED GENERAL NOTE (K). CHANGED REFERENCED STD. DWG. FROM RP-NMC-10 TO RP-VC-10. ADDED NOTE (A) AND RENUMBERED THE REST. ADDED SPECIAL NOTE. REDREW SHEET.

REV. 01-07-19: CORRECTED SPELLING. REDREW SHEET.

REV. 10-16-20: ADDED GENERAL NOTE (M). ADDED MINERAL AGGREGATE ITEM NUMBER AND REFERENCE NOTE ON SECTION B-B.

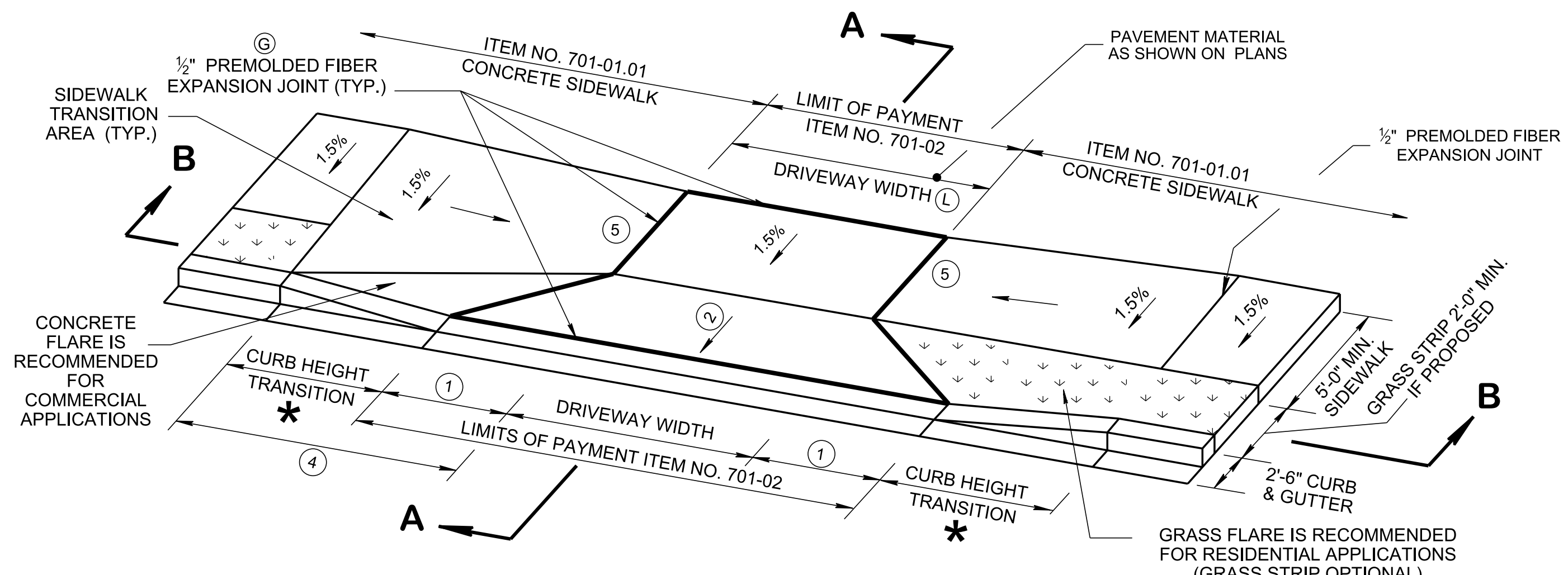
REV. 06-15-21: REVISED AND MERGED GENERAL NOTES (J) AND (K). ADJUSTED LOCATION OF GENERAL NOTE NO'S. REVISED GENERAL NOTES (C), (K) AND (L). ADDED PAY ITEM NO'S. 701-01.01, 701-02.02 AND 702-03.

APPROVED BY FHWA
(ALL OTHERS APPROVED BY TDOT)

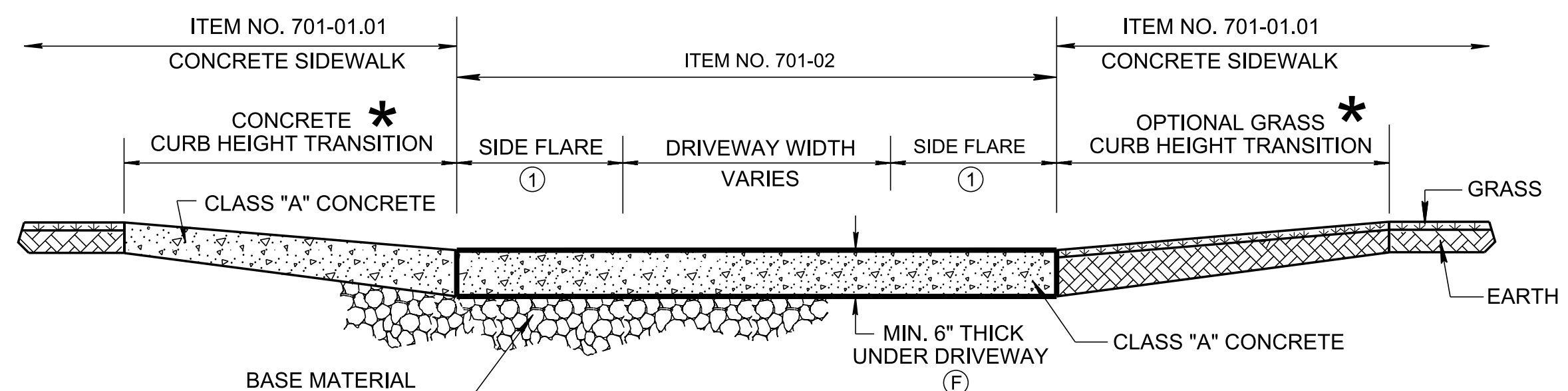
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

DETAILS OF
STANDARD
CONCRETE
DRIVEWAYS

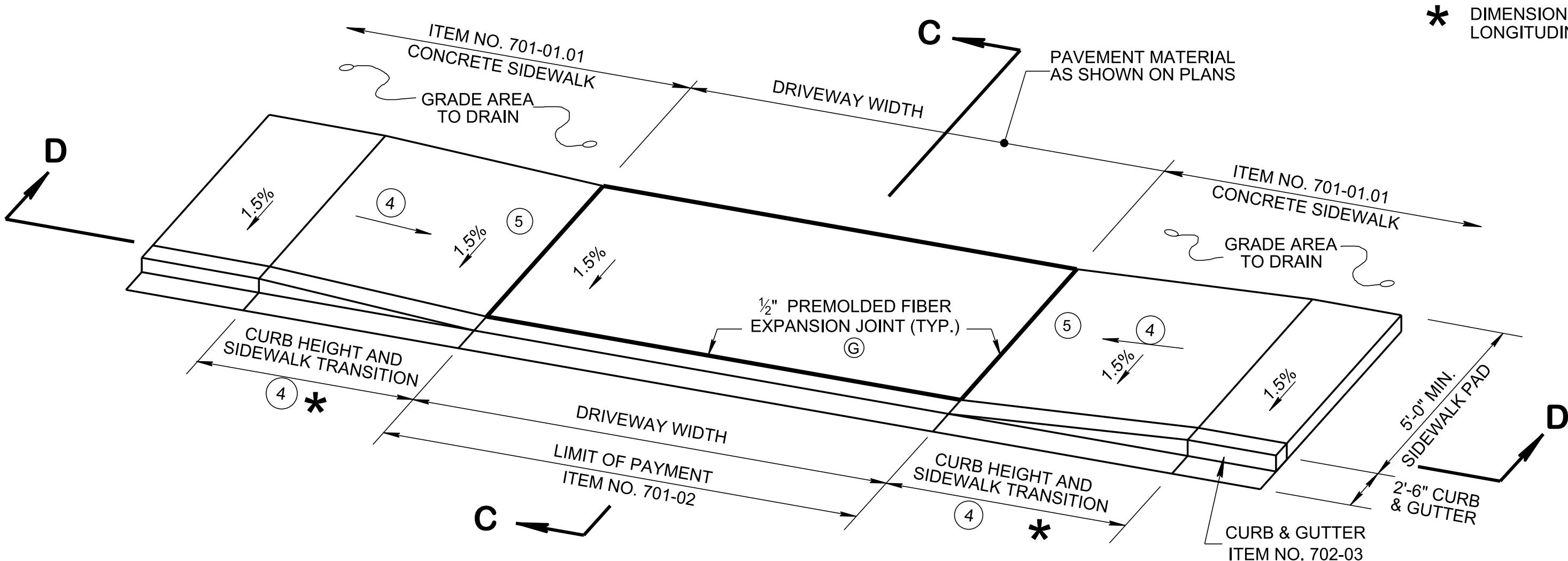
7/16/2021 7:49:16 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings\Standard Roadway Drawings - CURRENT\In Progress\10-104.00 Roadway, Pavement Appurtenances and Fence IP104.02 Intersections IP104.02



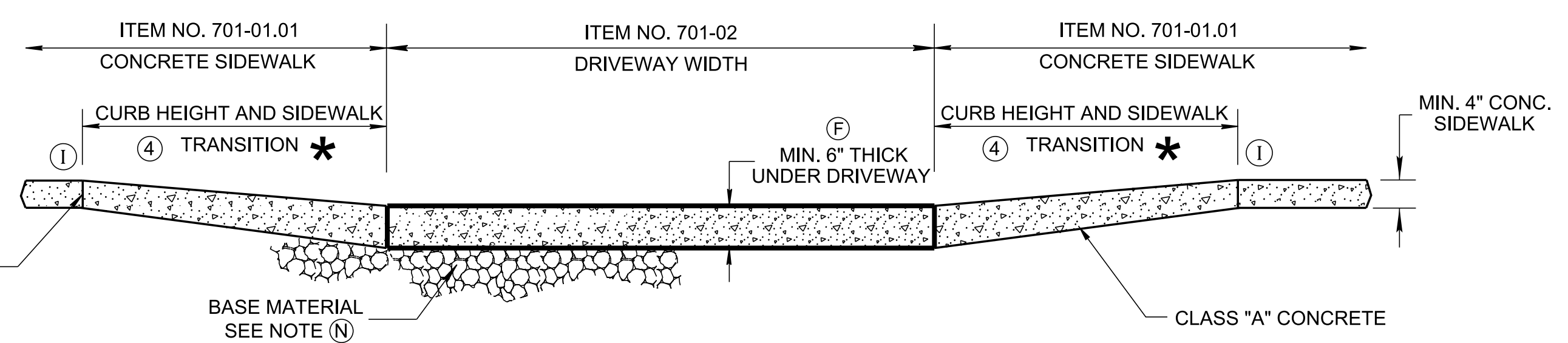
TYPE "B" DRIVEWAY ACROSS LOWERED SIDEWALK (WITH GRASS STRIP)



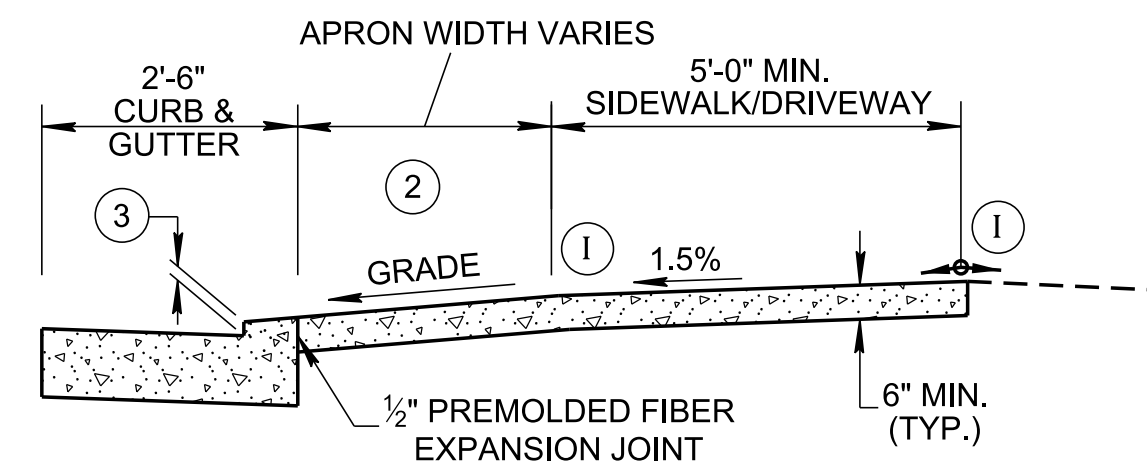
SECTION B-B



TYPE "C" DRIVEWAY ACROSS LOWERED SIDEWALK



SECTION D-D



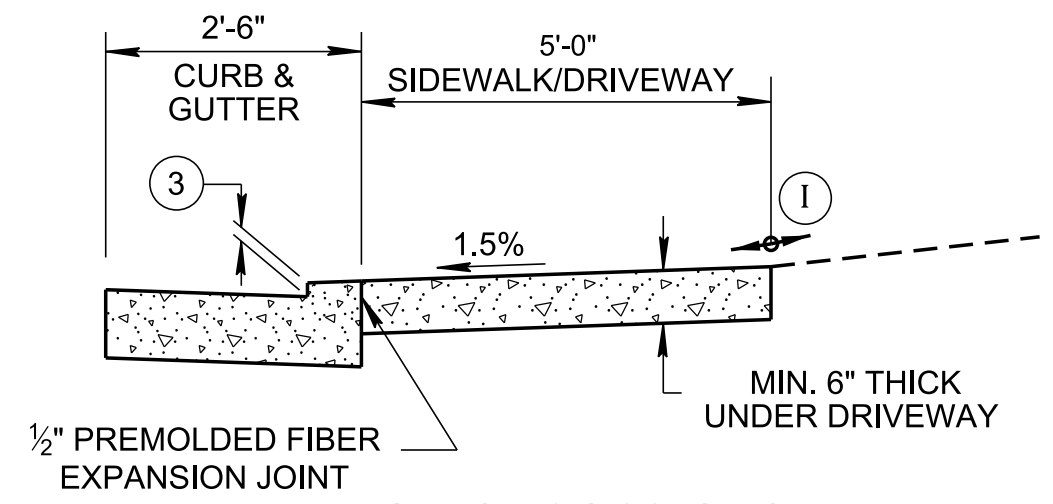
SECTION A-A

FOOTNOTES

- (1) SIDE FLARE WIDTH SHOULD BE A MINIMUM 7'-0" FOR COMMERCIAL DRIVEWAYS. SIDE FLARE WIDTH SHOULD BE A MINIMUM 3'-6" FOR RESIDENTIAL DRIVEWAYS.
- (2) DRIVEWAY RAMP GRADE VARIES, 15% MAX. (10% RECOMMENDED) APRON GRADE FOR RESIDENTIAL DRIVEWAYS. 8% MAX. (5% RECOMMENDED) APRON GRADE FOR COMMERCIAL DRIVEWAYS.
- (3) HEIGHT OF LOWERED CURB SHALL BE 2.25 INCHES. SEE STD DWG RP-VC-10 & RP-VC-11.
- (4) THE SLOPE OF THE SIDEWALK AND/OR CURB HEIGHT TRANSITION VARIES TO A MAXIMUM OF 8.33% LENGTH OF TRANSITION IS RELATIVE TO THE LONGITUDINAL ROADWAY GRADE.
- (5) COMMERCIAL DRIVEWAY ENTRANCE TYPICALLY (MAX. 40' WIDE) MAY REQUIRE DETECTABLE WARNING SURFACES IF ENTRANCE SERVES MORE THAN 400 VEHICLES PER DAY. SEE STD. DWG. NOS. MM-CR- SERIES FOR DETAILS.
- (6) 3R PROJECTS MAY REQUIRE SLOPE CORRECTION, PARALLEL CROSS-WALK MARKINGS (ESPECIALLY AT TWO WAY DRIVEWAY ENTRANCES), AND DETECTABLE DOME SURFACE TO MAINTAIN CONTINUITY AT COMMERCIAL DRIVE ENTRANCES. ADDITIONAL SIGNS (WATCH FOR PED) MAY BE ADDED AT DRIVEWAYS BY THE DIRECTION OF AN ENGINEER IF NEEDED.

LEGEND

* DIMENSION VARIES RELATIVE TO LONGITUDINAL ROADWAY GRADE.



SECTION C-C

GENERAL NOTES

- (A) DUE TO THE ELEVATION CHANGE FOR PEDESTRIANS ON THE SIDEWALK, THIS APPLICATION IS UNDESIRABLE AND IS TO BE USED IN LIMITED APPLICATIONS. SEE RP-D-15 FOR THE PREFERRED DRIVEWAY TYPE.
- (B) 5'-0" MINIMUM SIDEWALK WITH A MAXIMUM CROSS SLOPE OF 1.5% THROUGH DRIVEWAYS.
- (C) DESIGNER TO CHECK GUTTER FLOW DEPTH AT DRIVEWAY LOCATIONS TO ASSURE THAT THE DESIGN FLOW DOES NOT OVERTOP THE SIDEWALK AREA. IF OVERTOPPING OCCURS, PLACE AN INLET AT THE UPSTREAM SIDE OF THE DRIVEWAY OR PERFORM OTHER DESIGN MITIGATION
- (D) THE SLOPE OF THE LANDING AREA SHALL NOT EXCEED 1.5% IN THE SIDEWALK AREA.
- (E) DRIVEWAYS TO BE BUILT COMPLETE OR IN PART AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
- (F) ALL CONCRETE DRIVEWAYS TO BE 6" UNIFORM THICKNESS, UNLESS OTHERWISE SHOWN ON PLANS.
- (G) EXPANSION JOINTS ARE TO BE PLACED AS INDICATED ON THE PLANS. WHEN THE BACK OF THE DRIVEWAY ABUTS AGAINST A CONCRETE DRIVEWAY OR BUILDING, AN ADDITIONAL EXPANSION JOINT WILL BE PLACED AT THAT LOCATION.
- (H) THE ROADWAY DESIGNER SHALL CONSIDER THE USE OF A CATCH BASIN ON EITHER SIDE OF DRIVEWAY. CAREFUL CONSIDERATION TO THE PLACEMENT OF CATCH BASINS SHALL BE TAKEN IF THE DRIVEWAY IS IN A VERTICAL SAG CURVE.
- (I) ALGEBRAIC DIFFERENCE NOT TO EXCEED 10.0%.
- (J) PAY ITEMS:

ITEM NO: 303-01,	MINERAL AGGREGATE, TYPE A BASE, GRADING D,	PER TON.
ITEM NO: 701-01.01,	CONCRETE SIDEWALK (4"),	PER S.F.
ITEM NO: 701-02,	CONCRETE DRIVEWAY,	PER S.F.
ITEM NO: 701-02.02,	CONCRETE DRIVEWAY (8"),	PER S.F.
ITEM NO: 702-03,	CONCRETE COMBINED CURB & GUTTER,	PER C.Y.
- (K) WHEN MORE THAN 2 DRIVEWAYS ARE PROPOSED, USE TYPE "A" DRIVEWAY AS SHOWN ON STANDARD DRAWING RP-D-15 TO REDUCE ROLLER COASTER EFFECT FOR PEDESTRIANS.
- (L) TYPICAL DRIVEWAY WIDTHS ARE 12' (14' TWO WAY) FOR RESIDENTIAL AND 24' (40' MAX.) FOR COMMERCIAL. REFER TO SECTION 5 (ACCESS DESIGN) IN THE MANUAL FOR CONSTRUCTING DRIVEWAY ENTRANCES ON STATE HIGHWAYS (2015).
- (M) ALL SIDEWALKS SHALL HAVE A MINIMUM CONCRETE THICKNESS OF 4". THE SIDEWALK TRANSITION THICKNESS IS DEPEND ON THE DRIVEWAY AND THE SIDEWALK THICKNESSES, THE COST OF THE SIDEWALK TRANSITION WILL BE INCLUDED IN THE PAY ITEM NO. OF 701-01.01.
- (N) MINIMUM 4" MINERAL AGGREGATE BASE MATERIAL ITEM NO. 303-01 SHALL BE INSTALLED UNDER NEW CONCRETE DRIVEWAYS. SITE SPECIFIC PAVEMENT DESIGN MAY BE REQUIRED FOR COMMERCIAL DRIVEWAYS USED AS A DELIVERY ACCESS AS WELL. A DRIVEWAY PAVEMENT DESIGN WITH 6" CONCRETE PAVEMENT AND 4" AGGREGATE DEPTH MAY BE LIMITED TO LIGHT COMMERCIAL VEHICULAR TRAFFIC.

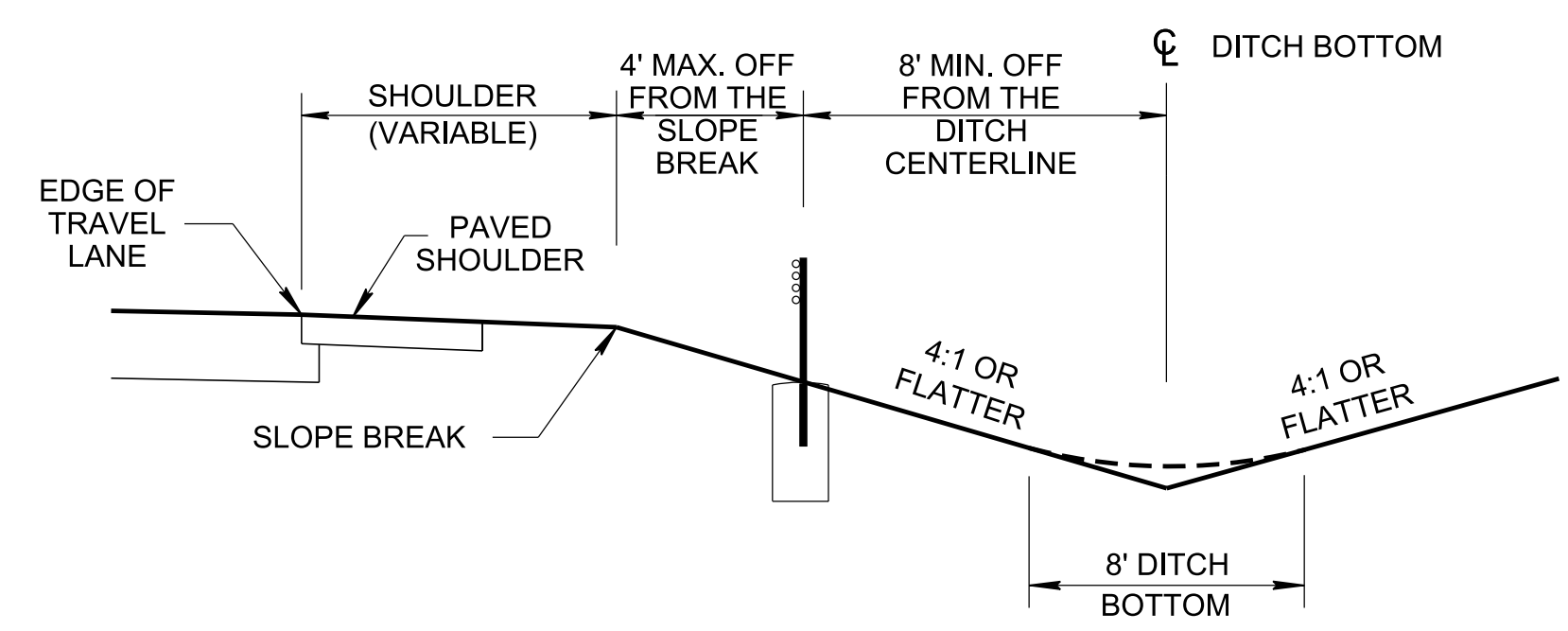
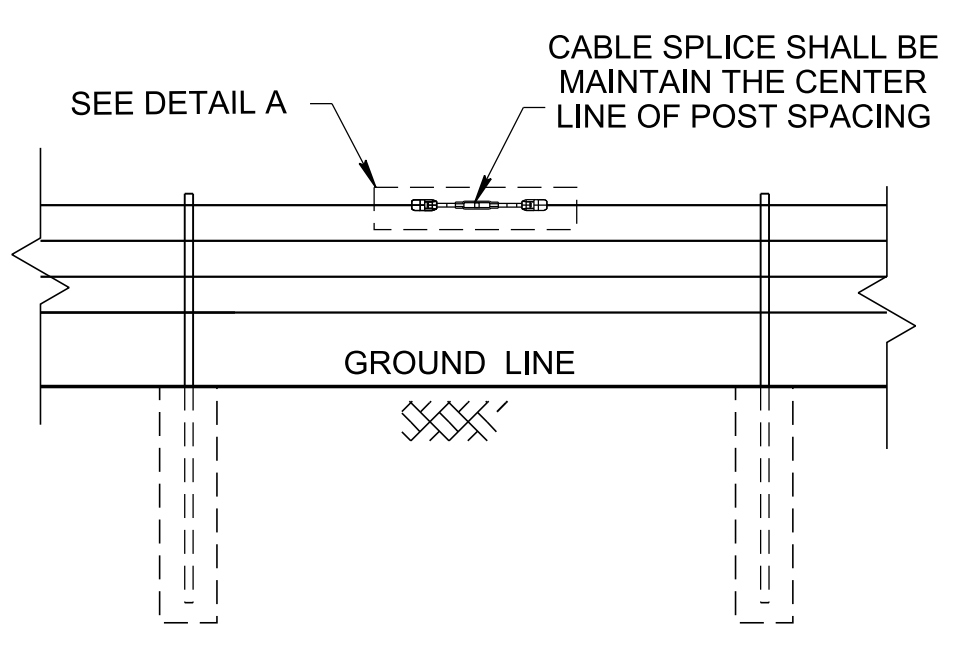
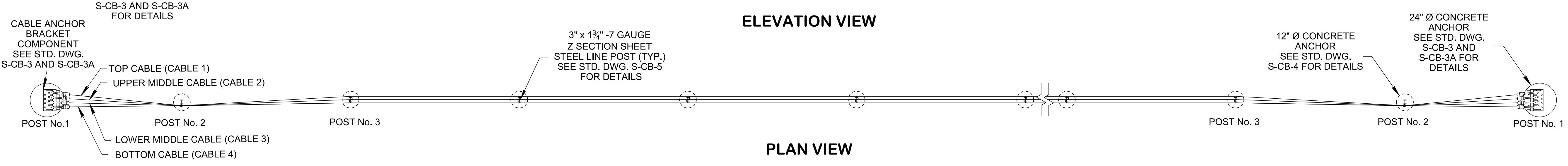
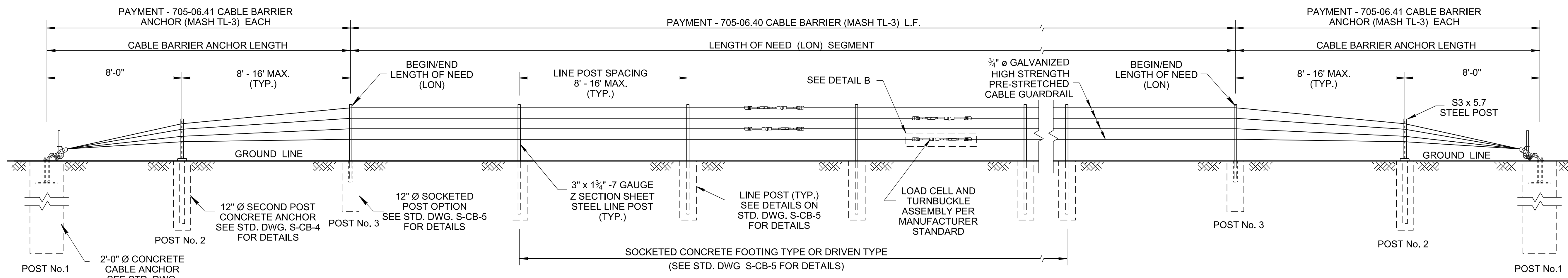
REV. 7-15-08: UPDATED SIDEWALK DIMENSIONS.
 REV. 4-8-16: ADDED ITEM NUMBERS, UPDATED SLOPES AND DIMENSIONS, UPDATED NOTES.
 REV. 07-16-18: ADDED NOTES TO CONC. FLARE AND GRASS FLARE IN ISOMETRIC VIEW. ADDED GENERAL NOTE (M) & (N).
 REV. 01-07-19: ADDED LIMITS FOR ITEM NO. 701-02. ADJUSTED LOCATION OF GENERAL NOTE NO'S. (1) & (N) ON DETAILS. REDREW SHEET.
 REV. 10-16-20: ADDED GENERAL NOTE (O) MINERAL AGGREGATE ITEM NUMBER AND BASE MATERIAL ON SECTIONS B-B AND D-D.
 REV. 06-15-21: REVISED AND MERGED GENERAL NOTES (1) AND (M). ADJUSTED LOCATION OF GENERAL NOTE NO'S. REVISED GENERAL NOTES (O) AND (N) ADDED PAY ITEM NO. 701-02.02.

APPROVED BY FHWA (ALL OTHERS APPROVED BY TDOT)

STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

DETAILS OF LOWERED STANDARD CONCRETE DRIVEWAYS

7/16/2021 11:23:08 AM P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails\10-106.02 Cable Barrier\IP\SCB2-20210603.dgn



NOTE: 8' POST SPACING IS REQUIRED FOR 4:1 FILL SLOPE.

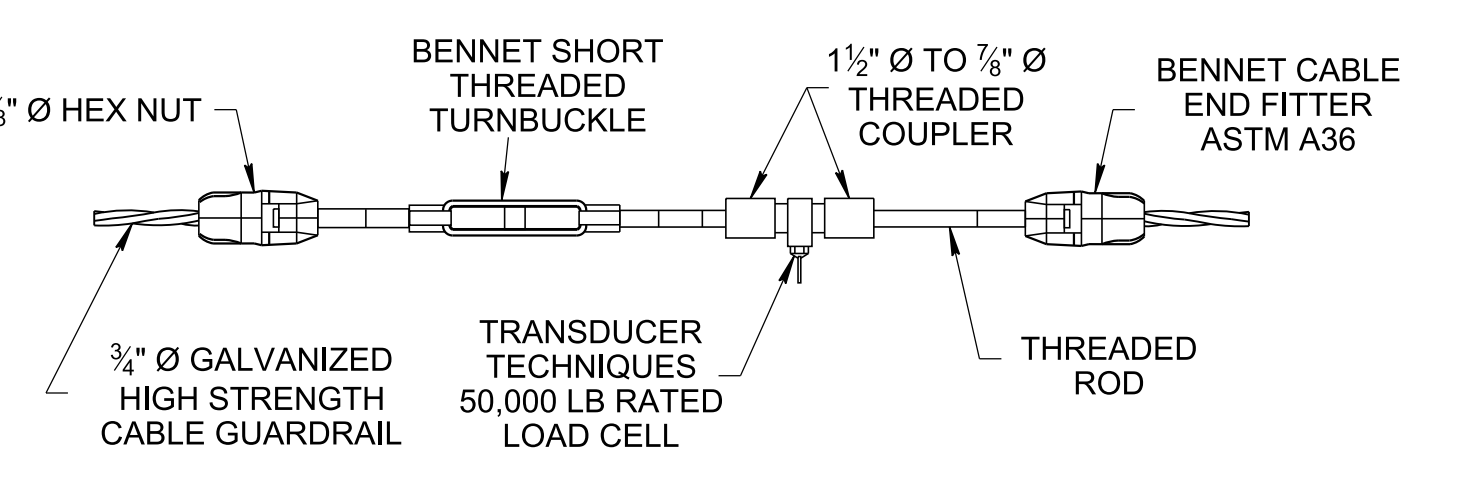
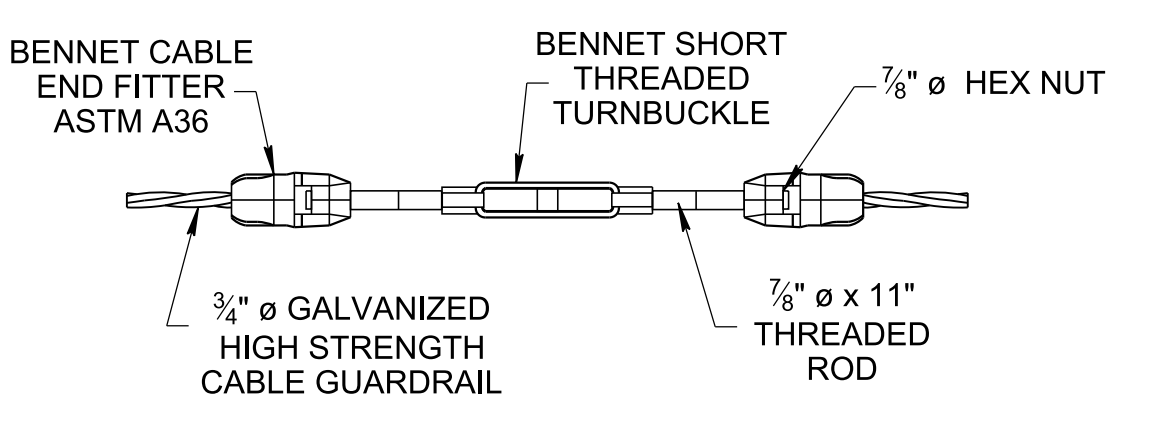


TABLE A

POST SPACING (LF)	DEFLECTION (LF)
8	7
10	8.5
16	11

TABLE B

PRE-STRETCHED CABLE TENSION CHART

AMBIENT TEMPERATURE (° F)	MIN. REQUIRED CABLE TENSION (LB)
110	2240
100	2500
90	2760
80	3021
70	3281
60	3541
50	3801
40	4062
30	4322
20	4582
10	4842
0	5102
-10	5363
-20	5623

GENERAL NOTES

- (A) THE NON-PROPRIETARY HIGH TENSION CABLE BARRIER (HTCB) SYSTEMS CONSIST OF A GENERAL HTCB SEGMENT BETWEEN BEGIN/END LENGTH OF NEED AND CONCRETE ANCHOR ASSEMBLIES OUTSIDE THE LENGTH OF NEED. THE CABLE BARRIER SYSTEM INCORPORATES FOUR EVENLY SPACED CABLES SUPPORTED BY WEAK POSTS AND INSTALLED WITHIN 4H:1V OR FLATTER FILL SLOPE ON MEDIAN DITCH.
- (B) NON-PROPRIETARY HIGH TENSION CABLE MEDIAN BARRIER HAS BEEN EVALUATED BY THE MIDWEST ROADSIDE SAFETY FACILITY AND MEETS MASH TL-3 STANDARDS, AND THE EVALUATION HAS BEEN DOCUMENTED IN THE MIDWEST ROADSIDE MIDWEST STATES POOLED FUND RESEARCH REPORT NO. TRP-03-327-16.
- (C) TABLE A INDICATES DEFLECTION TO DETERMINE THE REQUIRED POST SPACING. THE POST SPACING VARIES BETWEEN 8 FT TO 16 FT MAXIMUM PER SPECIFIED DEFLECTIONS. 8 FT POST SPACING TO BE USED WITHIN 4:1 SLOPE AND 8 FT OR 10 FT POST SPACING TO BE USED FOR 6:1 SLOPE. THE 16 FT SPACING IS NOT DESIRABLE, MAY BE USED IN THE VICINITY OF THE DITCH SLOPE. POST SPACING MAY VARY WHEN ENCOUNTERING UNDERGROUND CONFLICTS AS LONG AS THE POST SPACING REMAINS BETWEEN 8 FT TO 16 FT.
- (D) HTCB INSTALLATION LENGTH SHALL BE MINIMUM 600 FT TO MAXIMUM 5000 FT.
- (E) CABLE BARRIER SHALL BE 3/4" DIAMETER CLASS A GALVANIZED 3x7 (PRE-STRETCHED) AASHTO M30-92/ASTM A741-98 MINIMUM BREAKING STRENGTH OF 39 KIPS.
- (F) REFER TO STANDARD DRAWING S-CB-1 FOR CABLE BARRIER PLACEMENT DETAILS.
- (G) REFER TO STANDARD DRAWINGS S-CB-3, S-CB-3A, S-CB-4 AND S-CB-5 FOR CABLE BARRIER DETAILS.
- (H) REFER TO STANDARD DRAWING RD11-TS-SERIES FOR TYPICAL SECTION INFORMATION.
- (I) REFER TO STANDARD DRAWING T-M-18 FOR CABLE BARRIER DELINEATOR. DELINEATOR COST TO BE INCLUDED IN THE COST OF CABLE BARRIER.
- (J) SEE TABLE B FOR TENSION AMOUNT AT CABLE TEMPERATURE FOR INITIAL INSTALLATION.
- (K) HIGH TENSION CABLE BARRIER SHALL BE PLACED ON A SMOOTH SURFACE. ADDITIONAL COMPACTED FILL MAYBE REQUIRED TO MAINTAIN THE MAXIMUM HEIGHT FROM THE BOTTOM HTCB CABLE TO THE TOP OF THE GROUND.
- (L) BARRIER INSTALLATIONS REQUIRE ADEQUATE CLEAR SPACE BETWEEN THE BARRIER AND OPPOSING HAZARDS TO ACCOMMODATE THE ANTICIPATED DYNAMIC DEFLECTION.
- (M) PAYMENT:
 FURNISHING AND INSTALLING CONCRETE ANCHOR AND POST FOUNDATIONS, CABLE BARRIER HARDWARE, INCLUDING BUT NOT LIMITED TO LINE POSTS, SOCKET SLEEVES, TURNBUCKLES, TERMINAL FITTINGS, TERMINAL ANCHORAGE DEVICES, CABLE-TO-LINE POST CONNECTORS, AND SPLICE FITTINGS HARDWARE INCLUDING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES SHALL BE PAID UNDER HIGH TENSION CABLE BARRIER ITEM NUMBERS.
 PAY ITEMS FOR HIGH TENSION CABLE BARRIER WILL BE UNDER THE FOLLOWING ITEM NUMBERS:
 705-06.40 CABLE BARRIER (MASH TL-3) L.F.
 705-06.41 CABLE BARRIER ANCHOR (MASH TL-3) EACH

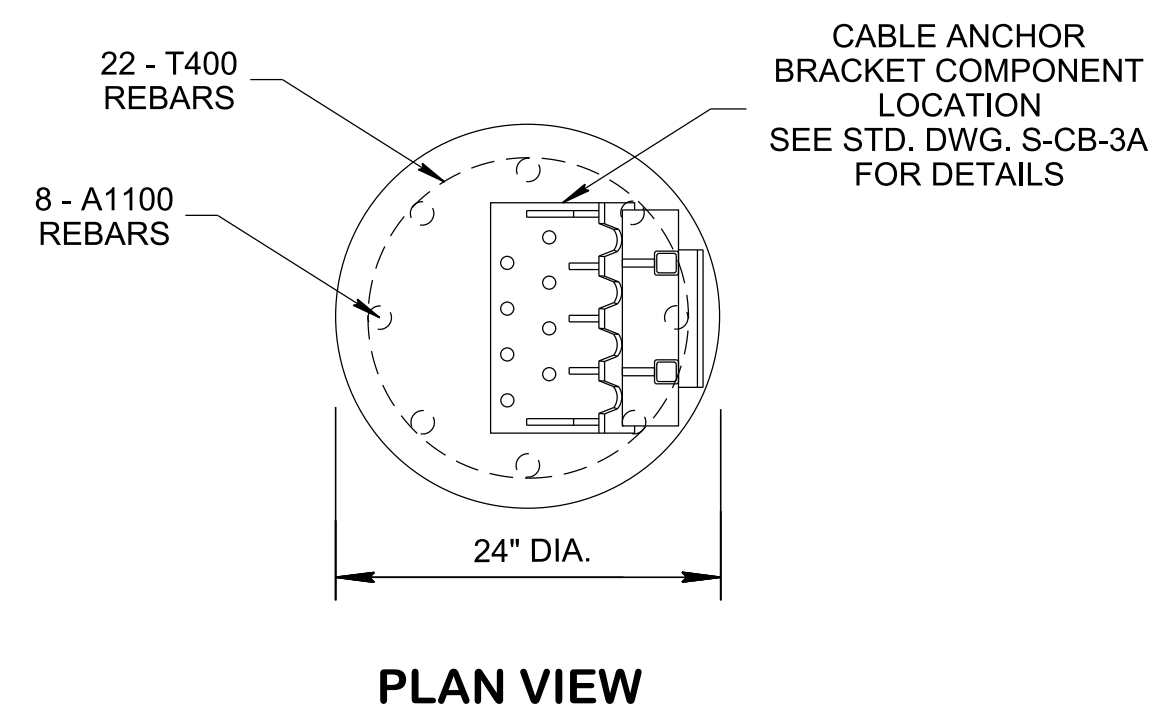
STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

HIGH TENSION CABLE BARRIER

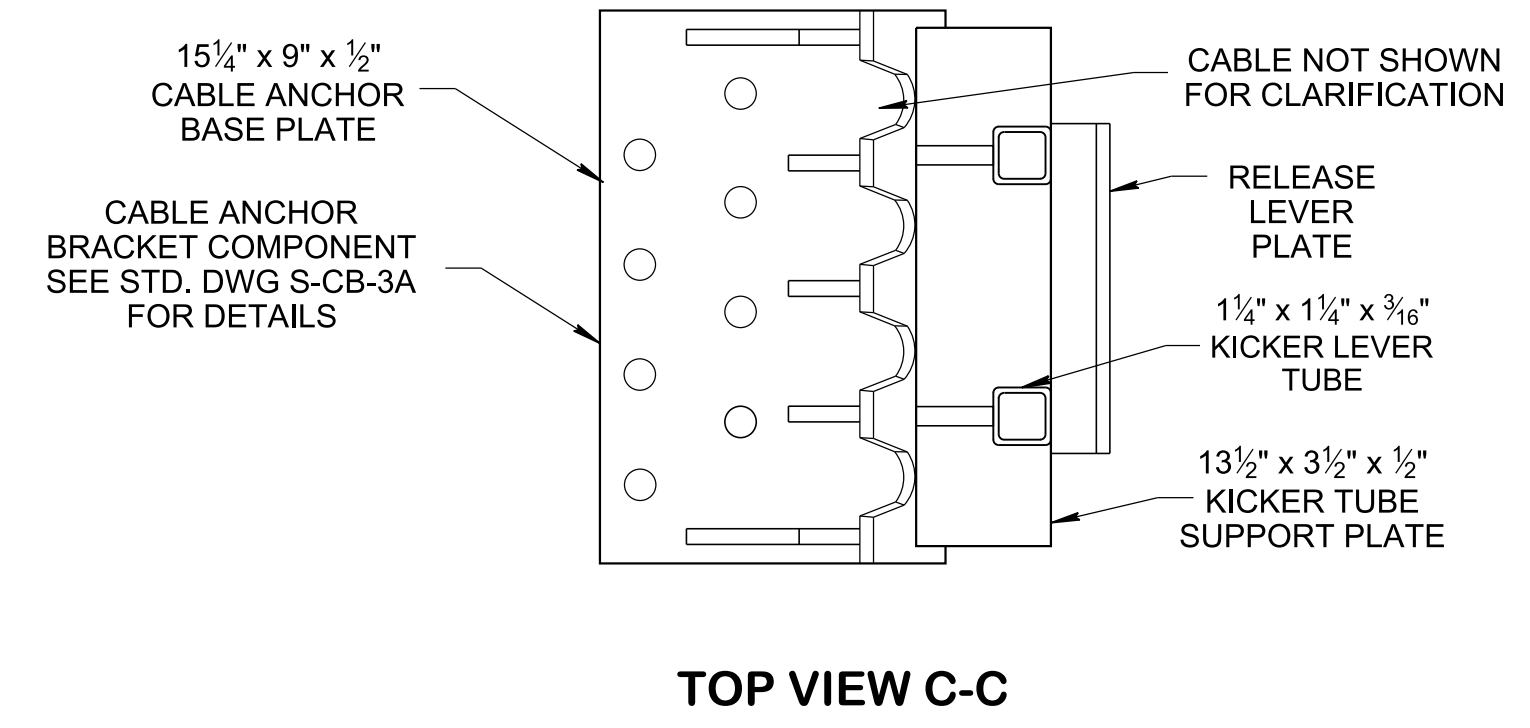
06-03-2021 S-CB-2

NOT TO SCALE

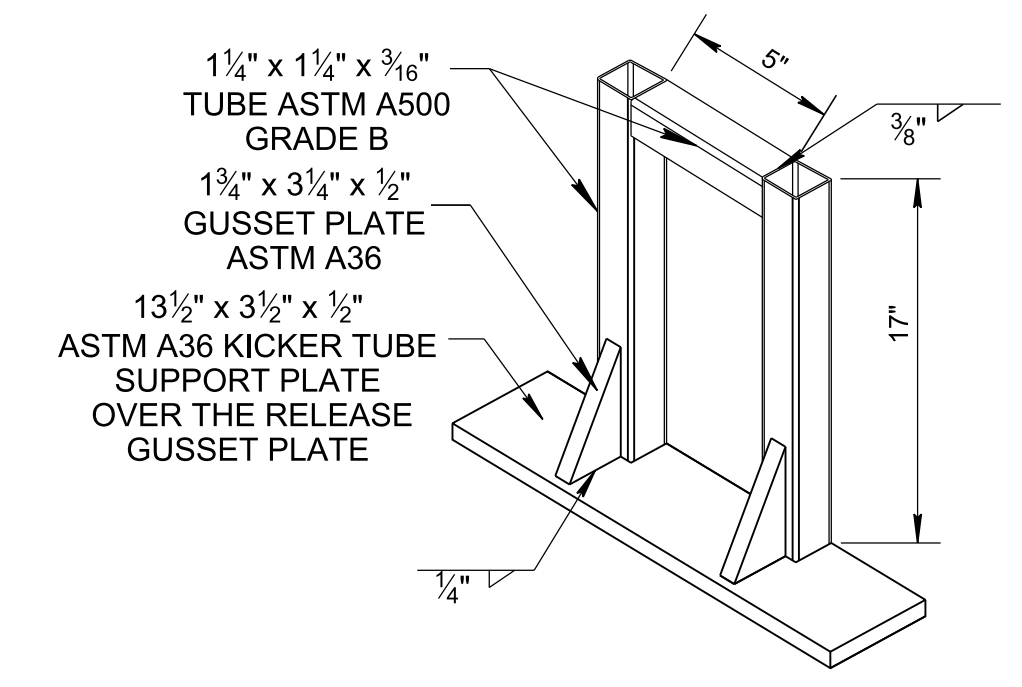
7/16/2021 11:27:35 AM
 P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.02 Cable Barrier IP\SCB3-20210603.dgn



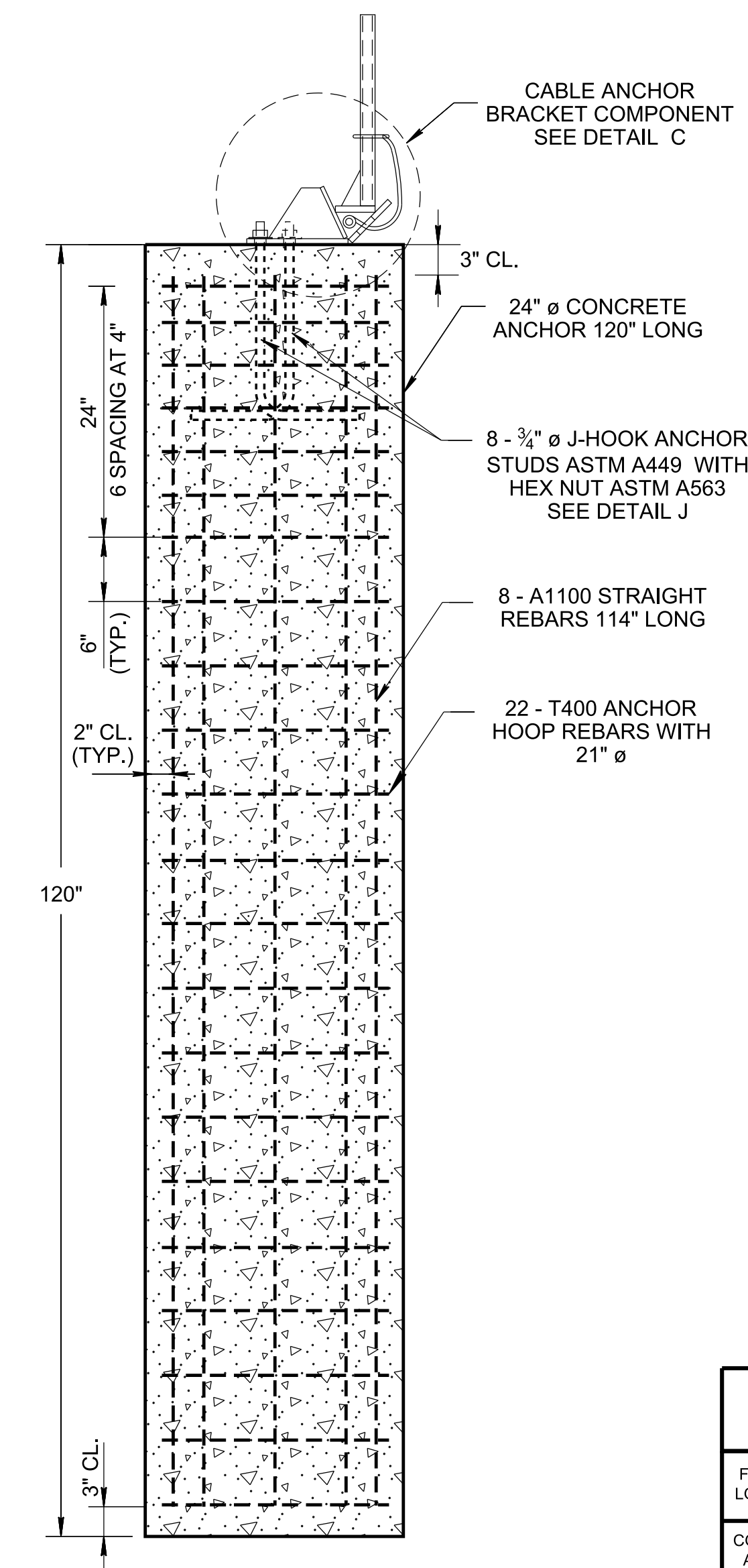
PLAN VIEW



TOP VIEW C-C



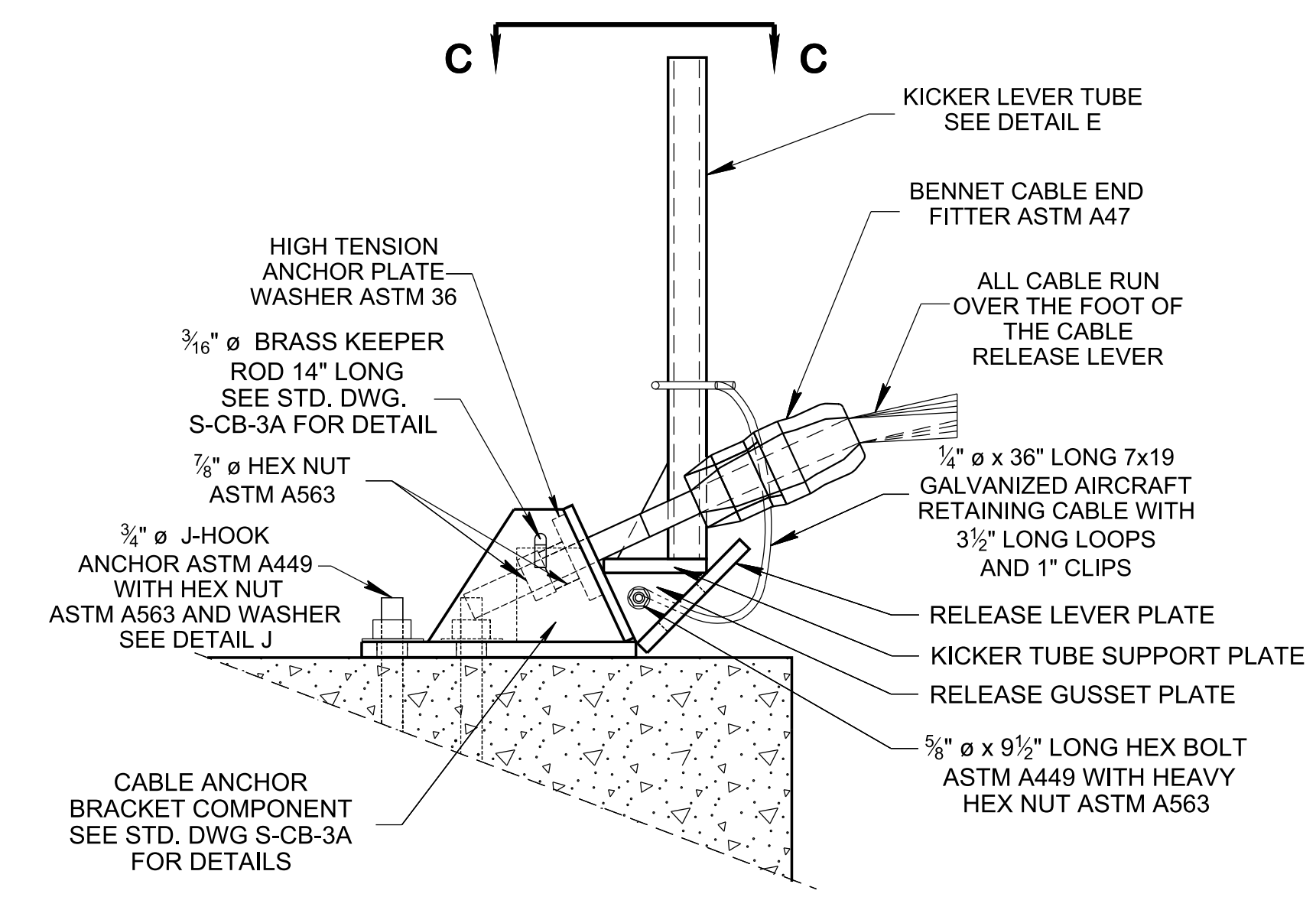
**DETAIL E
FOR KICKER LEVER TUBE
ISOMETRIC VIEW**



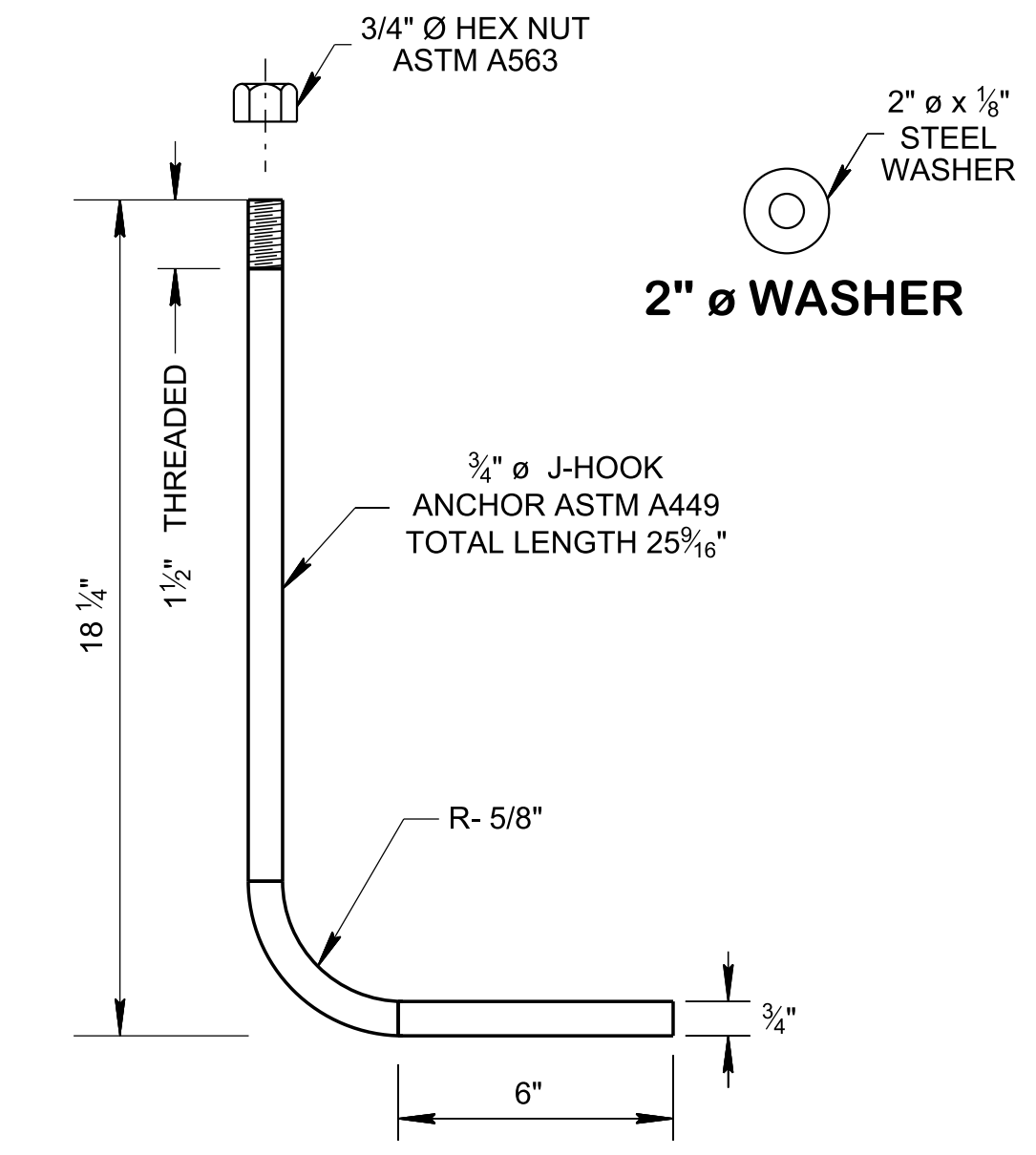
**CONCRETE ANCHOR FOUNDATION
DETAIL**

QUANTITIES (PER EACH POST)				
FOOTING LOCATION	DIAMETER (FT.)	DEPTH (FT.)	CONCRETE (C. Y.)	REINFORCING STEEL (LB.)
CONCRETE ANCHOR	2'-0"	10'-0"	1.17	500.00

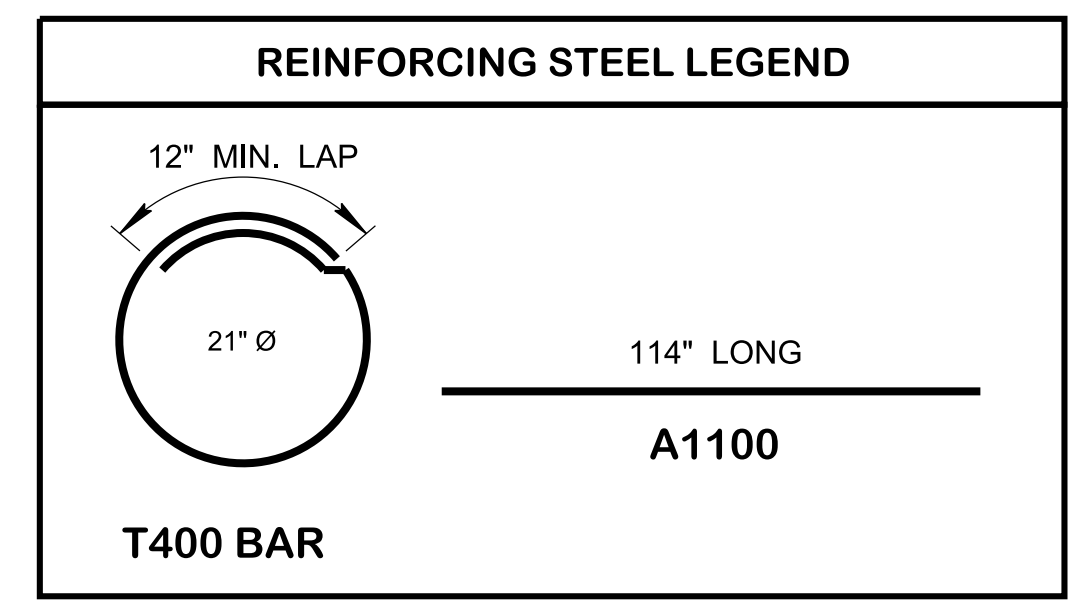
BILL OF STEEL				
BAR TYPE	BAR SIZE	NUMBER REQUIRED	LENGTH	REINFORCING STEEL (LB.)
T400	4	22	6'-6"	95.53
A1100	11	8	9'-6"	403.80



**DETAIL C
FOR CABLE ANCHOR BRACKET COMPONENT**



**DETAIL J
FOR J-HOOK ANCHOR**



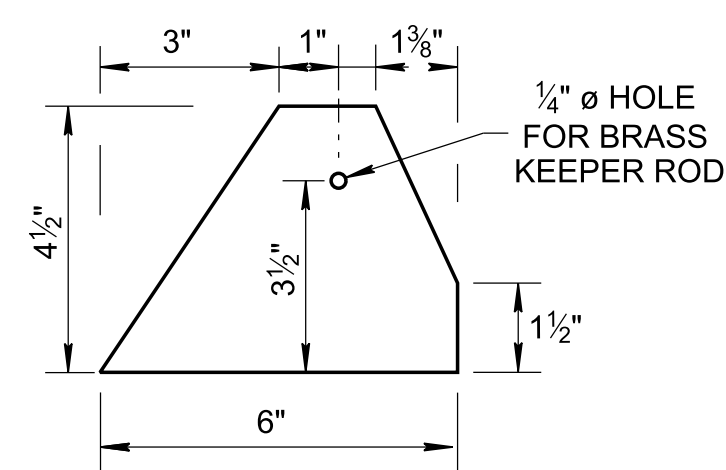
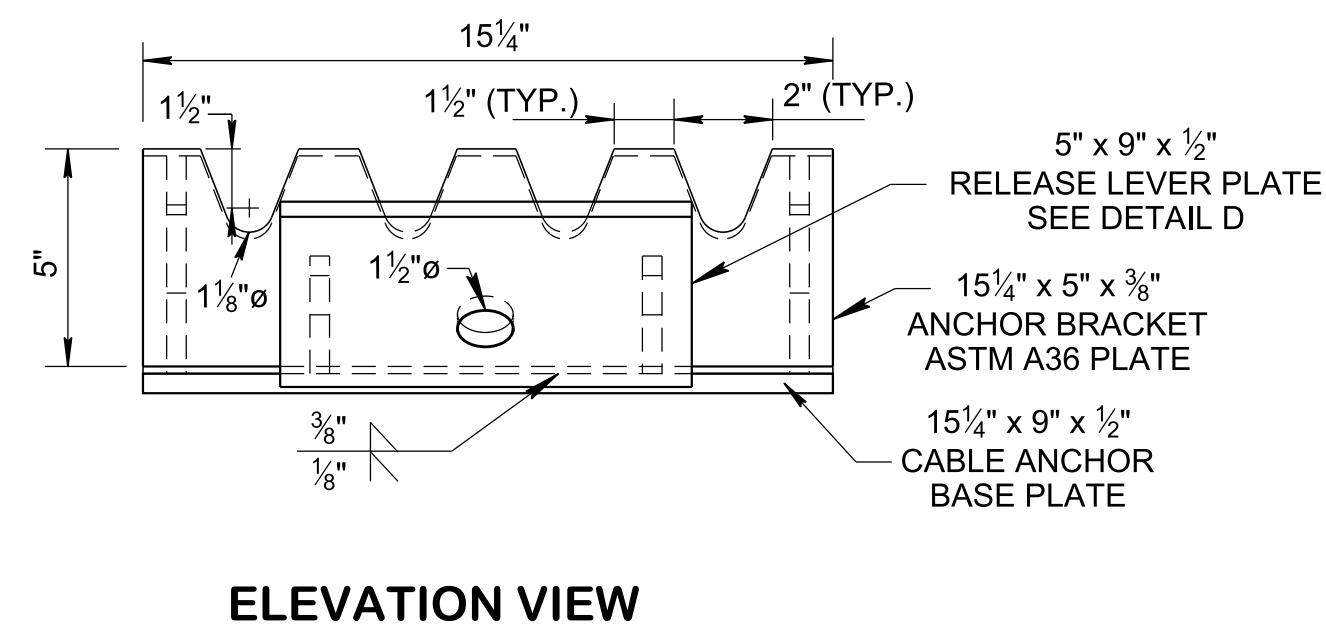
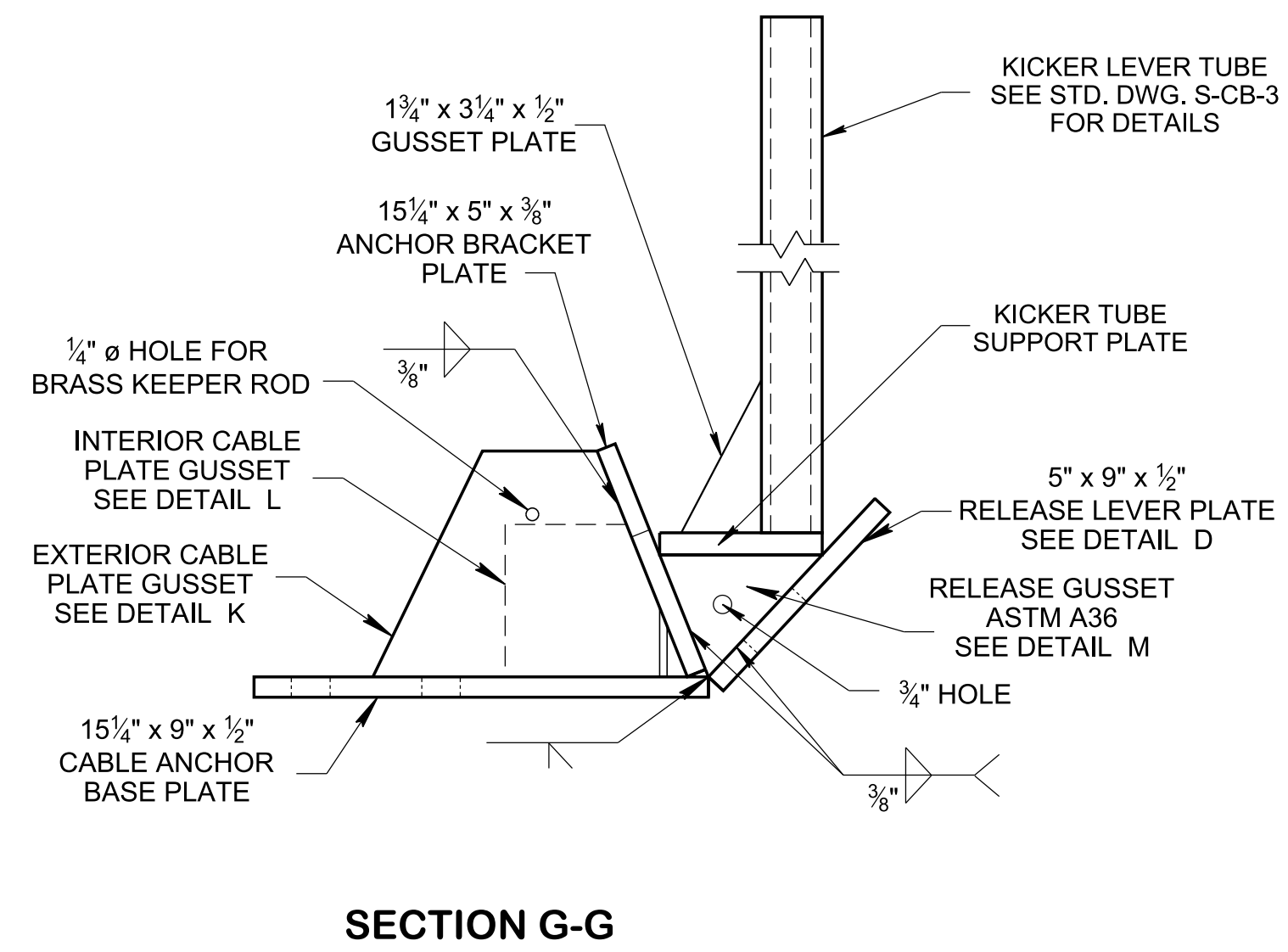
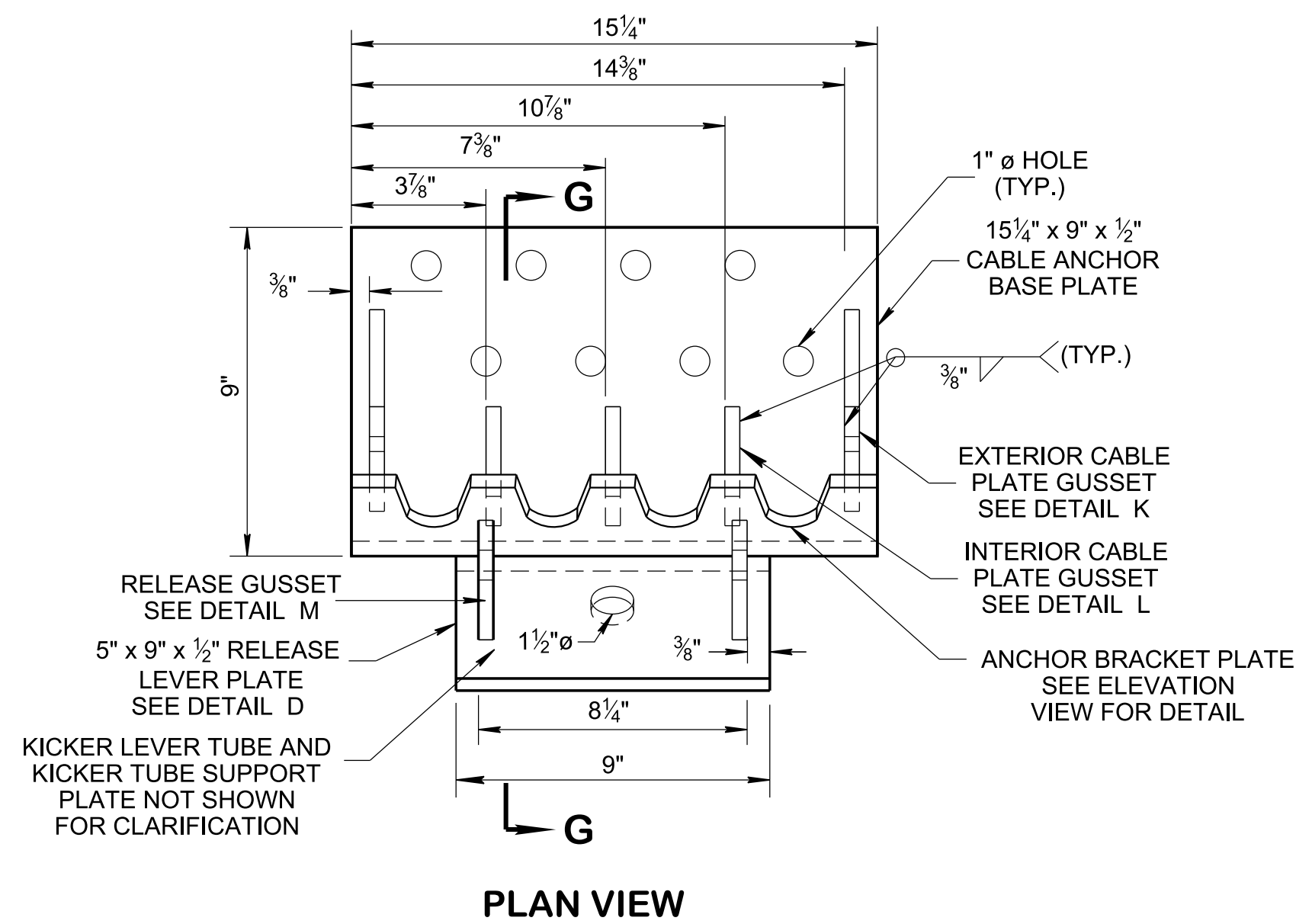
GENERAL NOTES

- (A) CONCRETE ANCHOR FOUNDATION SHALL BE CONSTRUCTED WITH CLASS 'A' CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI, AND MIXED IN ACCORDANCE WITH SECTION 604 OF THE STANDARD SPECIFICATIONS.
- (B) REINFORCING STEEL: TO BE ASTM A615. PLACE ALL STEEL REINFORCEMENT 2" MINIMUM FROM OUTSIDE FACE OF WALL, EXCEPT AS OTHERWISE SHOWN. ALL REINFORCING STEEL BARS ARE TO BE EPOXY COATED MEETING ALL REQUIREMENTS OF ASTM D3963.
- (C) ALL TUBES SHALL BE ASTM A500 GRADE B AND SHALL BE GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND ALL STEEL PLATES SHALL CONFORM TO ASTM A36. ALL CABLE ANCHORS SHALL BE GALVANIZED FOLLOWING FABRICATION. ALL CUTTING, DRILLING, AND WELDING OF STEEL COMPONENTS SHALL BE DONE BEFORE BEING GALVANIZED.
- (D) ALL WELDING SHALL BE PERFORMED BY A WELDER QUALIFIED IN ACCORDANCE WITH THE AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION).
- (E) REFER TO STANDARD DRAWINGS S-CB-2, S-CB-3A, S-CB-4, AND S-CB-5 FOR ADDITIONAL DETAILS.
- (F) NON-PROPRIETARY HIGH TENSION CABLE MEDIAN BARRIER HAS BEEN EVALUATED BY THE MIDWEST ROADSIDE SAFETY FACILITY AND MEETS MASH TL-3 STANDARDS, AND THE EVALUATION HAS BEEN DOCUMENTED IN THE MIDWEST ROADSIDE MIDWEST STATES POOLED FUND RESEARCH REPORT NO. TRP-03-327-16.
- (G) THE FOUNDATION DESIGN IS BASED ON UNCLASSIFIED IN SITU SOIL ASSUMED TO BE COMPACTED. IF SOIL DOES NOT MEET COMPACTION, THE INSTALLER SHALL SUBMIT AN ALTERNATIVE FOUNDATION DESIGN FOR APPROVAL, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TN. ALL ALTERNATIVE DESIGNS SUBMITTED SHALL SHOW THE FOUNDATION DIMENSIONS AND STEEL REINFORCEMENT.
- (H) THE DETAILS SHOWN ON THIS DRAWING ARE BASED ON RESULTS OF FULL SCALE CRASH TESTS TO MASH TEST 3-11. REFER TO ENGINEER SHOP DRAWINGS FOR DETAILS NOT SHOWN ON THIS DRAWING.
- (I) PAYMENT:
FURNISHING AND INSTALLING CONCRETE ANCHOR FOUNDATIONS, POSTS, POST ASSEMBLIES, SQUARE TUBES, HARDWARE INCLUDING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES SHALL BE PAID UNDER ITEM NUMBER 705-06.41 CABLE BARRIER ANCHOR (MASH TL-3) EACH.

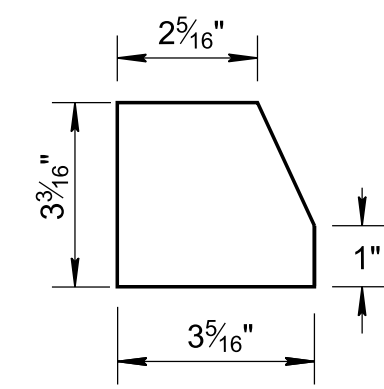
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

**CABLE BARRIER
ANCHOR
DETAILS**

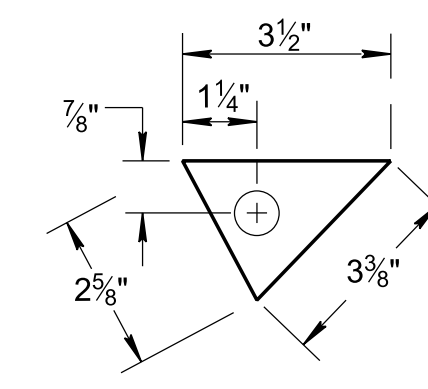
7/16/2021 11:29:14 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.02 Cable Barrier IPISCB3A-20210603.dgn



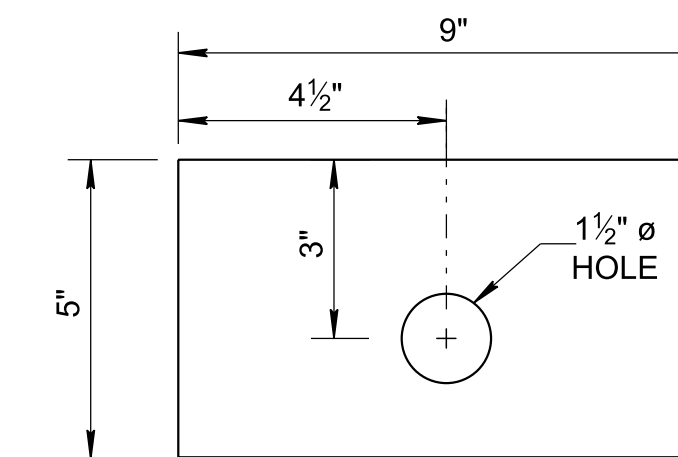
DETAIL K
1/2" THICK EXTERIOR
CABLE PLATE GUSSET



DETAIL L
1/2" THICK INTERIOR
CABLE PLATE GUSSET

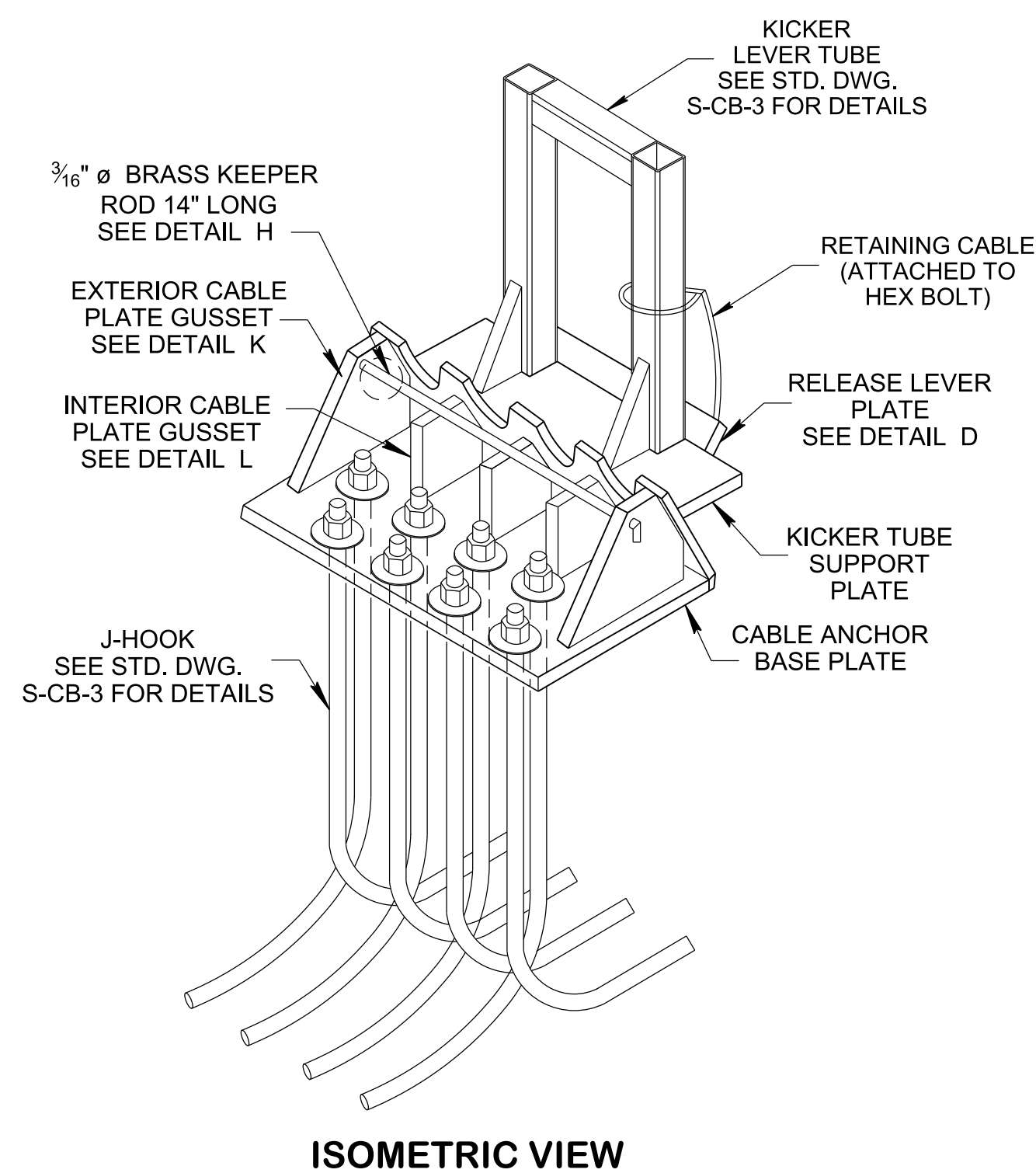


DETAIL M
1/2" THICK
RELEASE GUSSET

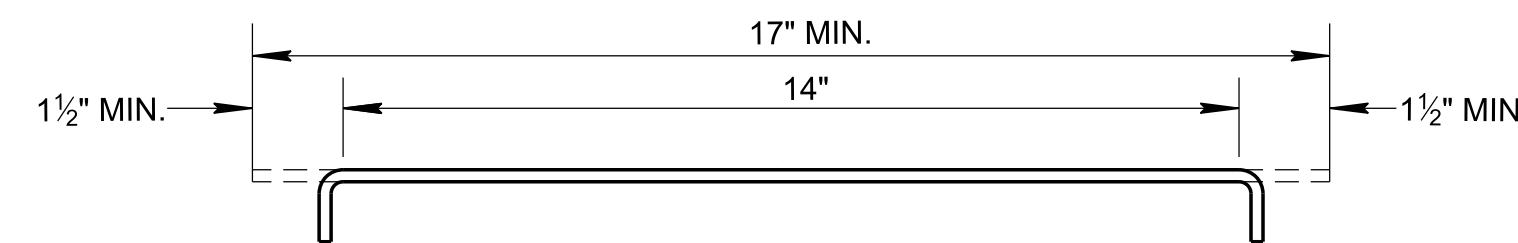


DETAIL D
1/2" THICK
RELEASE LEVER PLATE

CABLE ANCHOR BRACKET COMPONENT DETAILS



ISOMETRIC VIEW



DETAIL H
3/16" ϕ BRASS KEEPER ROD
TO BE BENT IN THE FIELD

(Note: brass rod to be placed after all cables are installed and tensioned. Slide rod through the 1/4 inch hole in anchor bracket, leaving a minimum of 1 1/2 inch on each side of the anchor bracket. Bend brass rod down on each side of anchor bracket to secure.)

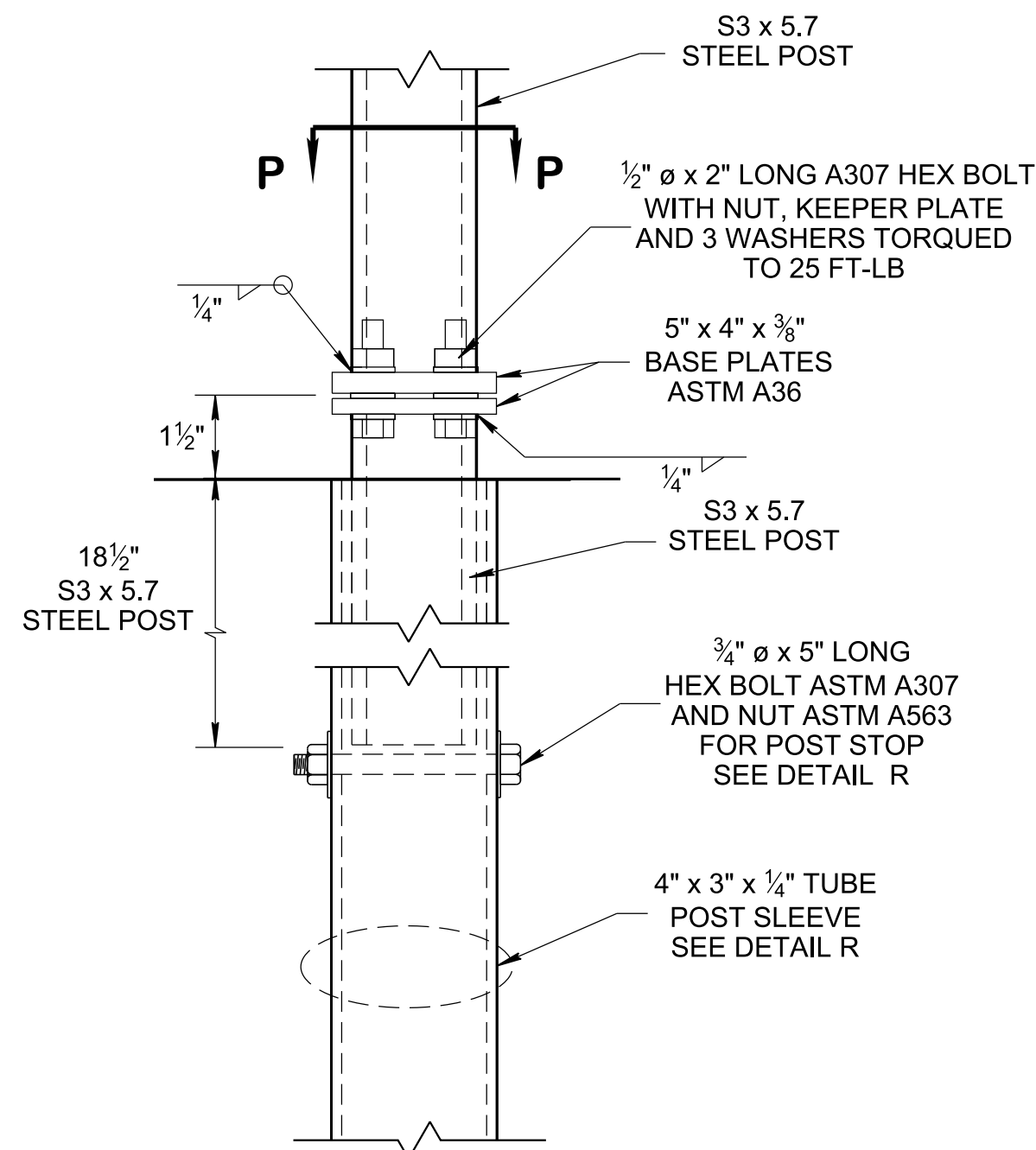
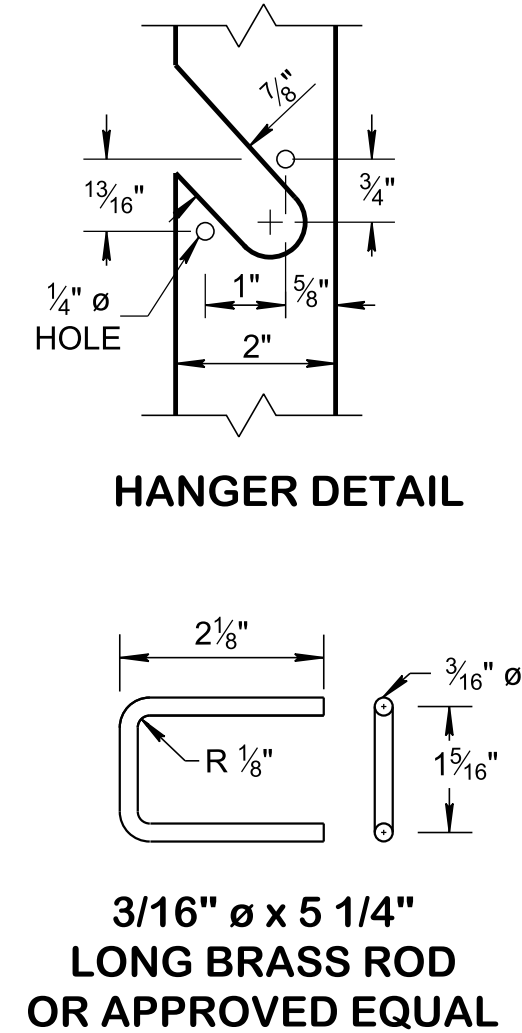
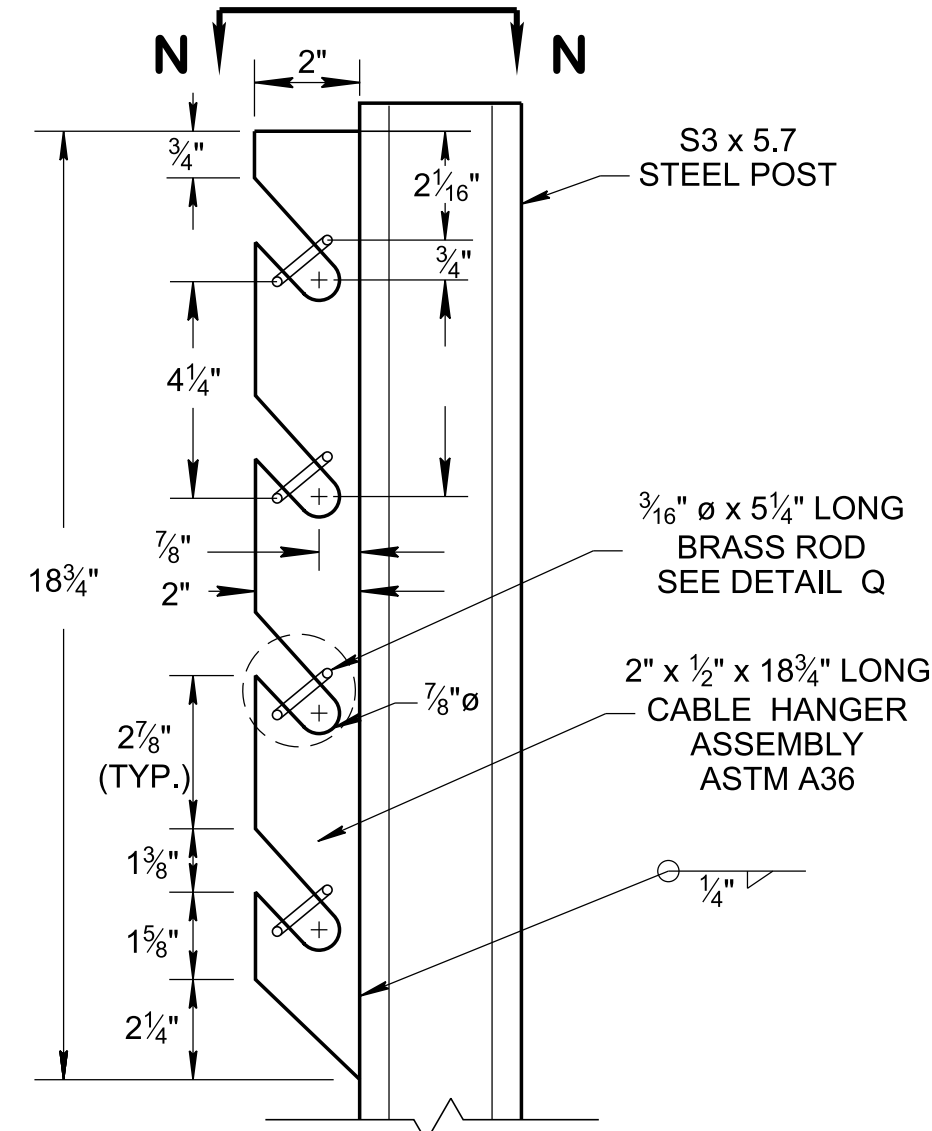
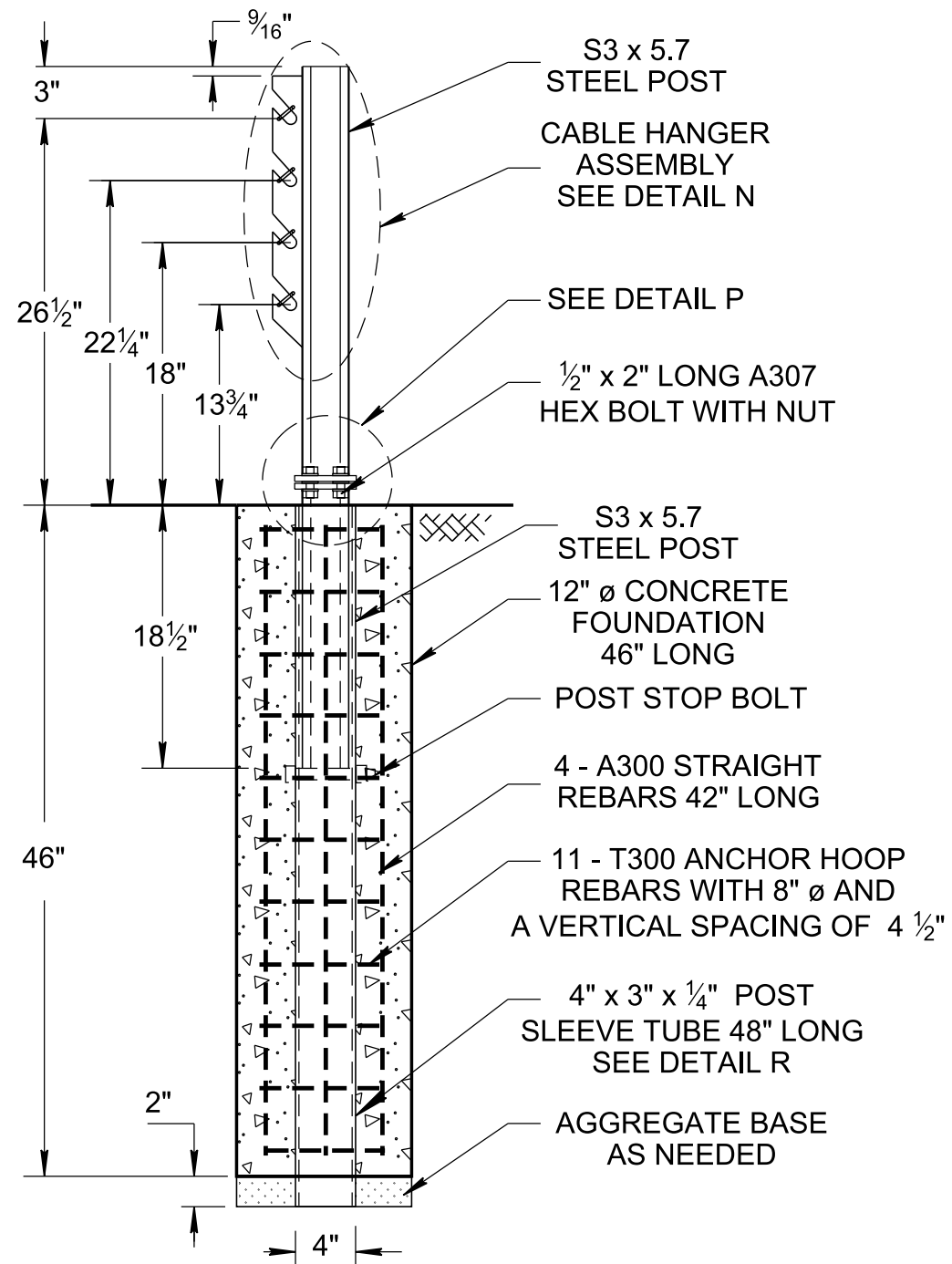
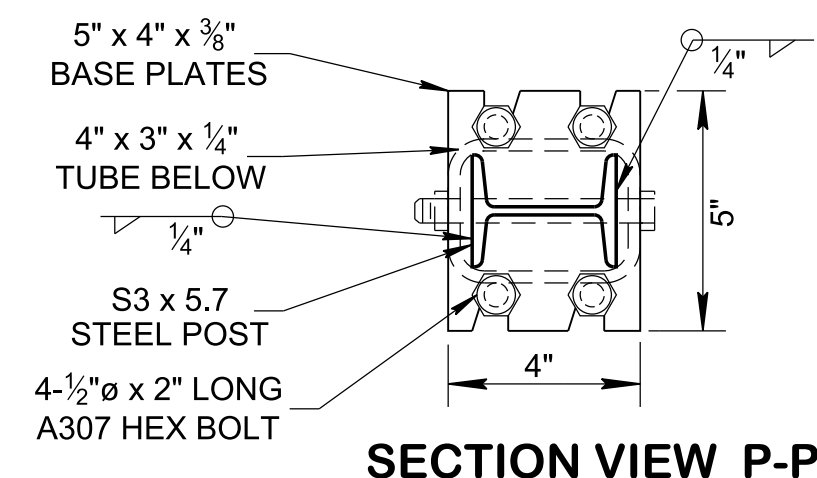
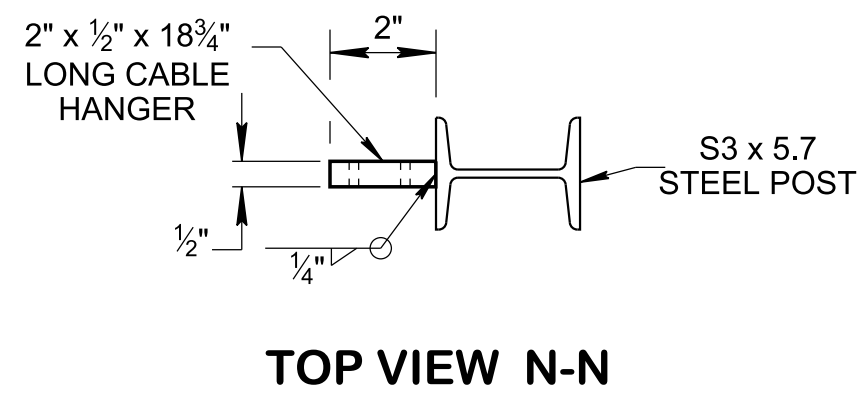
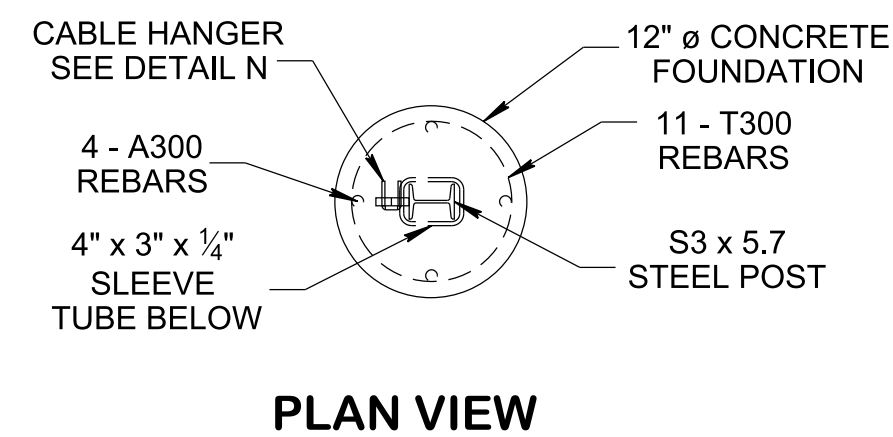
GENERAL NOTES

- (A) ALL TUBES SHALL BE ASTM A500 GRADE B AND SHALL BE GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED AND ALL STEEL PLATES SHALL CONFORM TO ASTM A36. ALL CABLE ANCHORS SHALL BE GALVANIZED FOLLOWING FABRICATION. ALL CUTTING, DRILLING, AND WELDING OF STEEL COMPONENTS SHALL BE DONE BEFORE GALVANIZED.
- (B) ALL WELDING SHALL BE PERFORMED BY A WELDER QUALIFIED IN ACCORDANCE WITH THE AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION).
- (C) REFER TO STANDARD DRAWINGS S-CB-2, S-CB-3, S-CB-4 AND S-CB-5 FOR ADDITIONAL DETAILS.
- (D) THE DETAILS SHOWN ON THIS DRAWING ARE BASED ON RESULTS OF FULL SCALE CRASH TESTS TO MASH TEST 3-11. REFER TO ENGINEER SHOP DRAWINGS FOR DETAILS NOT SHOWN ON THIS DRAWING.
- (E) PAYMENT:
FURNISHING AND INSTALLING CONCRETE ANCHOR FOUNDATIONS, POSTS, POST ASSEMBLIES, SQUARE TUBES, HARDWARE INCLUDING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES SHALL BE PAID UNDER ITEM NUMBER 705-06.41 CABLE BARRIER ANCHOR (MASH TL-3) EACH.

STATE OF TENNESSEE
STANDARD
DRAWING
DEPARTMENT OF TRANSPORTATION

**CABLE BARRIER
ANCHOR
BRACKET
DETAILS**

7/16/2021 1:26:04 PM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.02 Cable Barrier IPISCB4-20210603.dgn



CONCRETE ANCHOR # 2 FOUNDATION

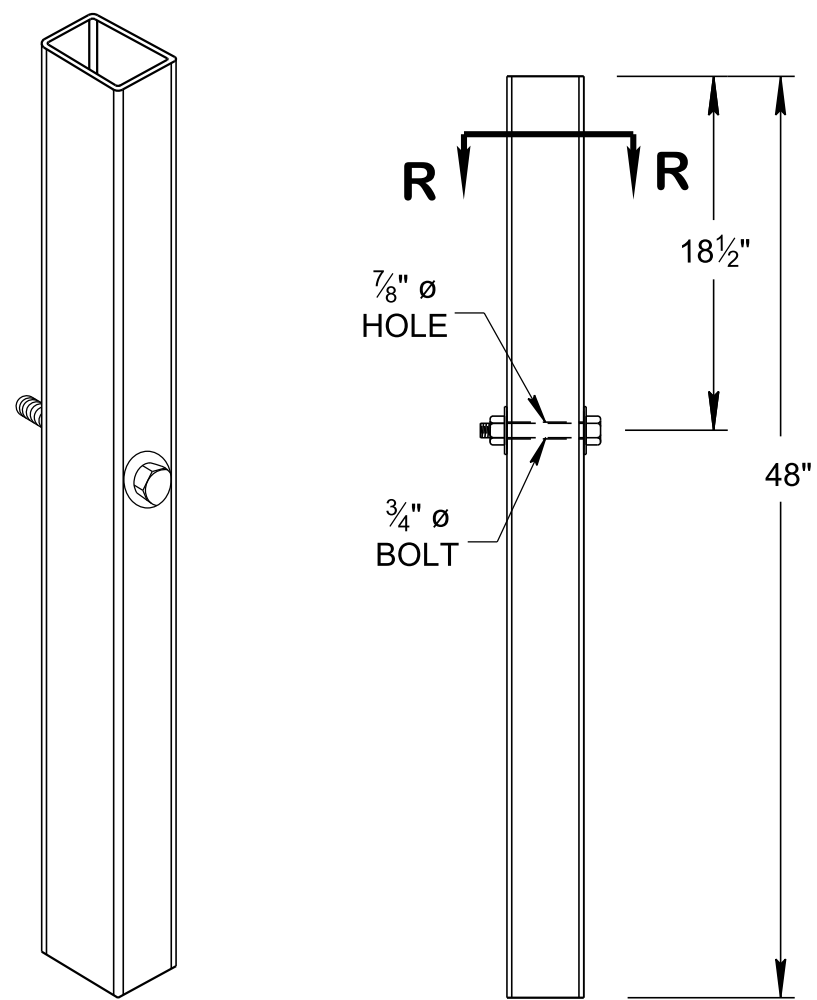
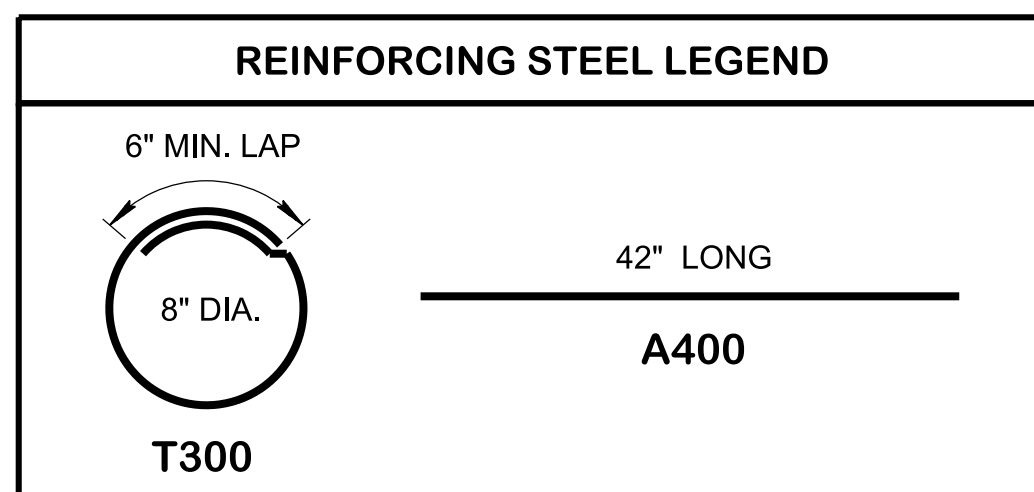
DETAIL N FOR CABLE HANGER ASSEMBLY

DETAIL Q FOR HANGER AND LONG BRASS ROD

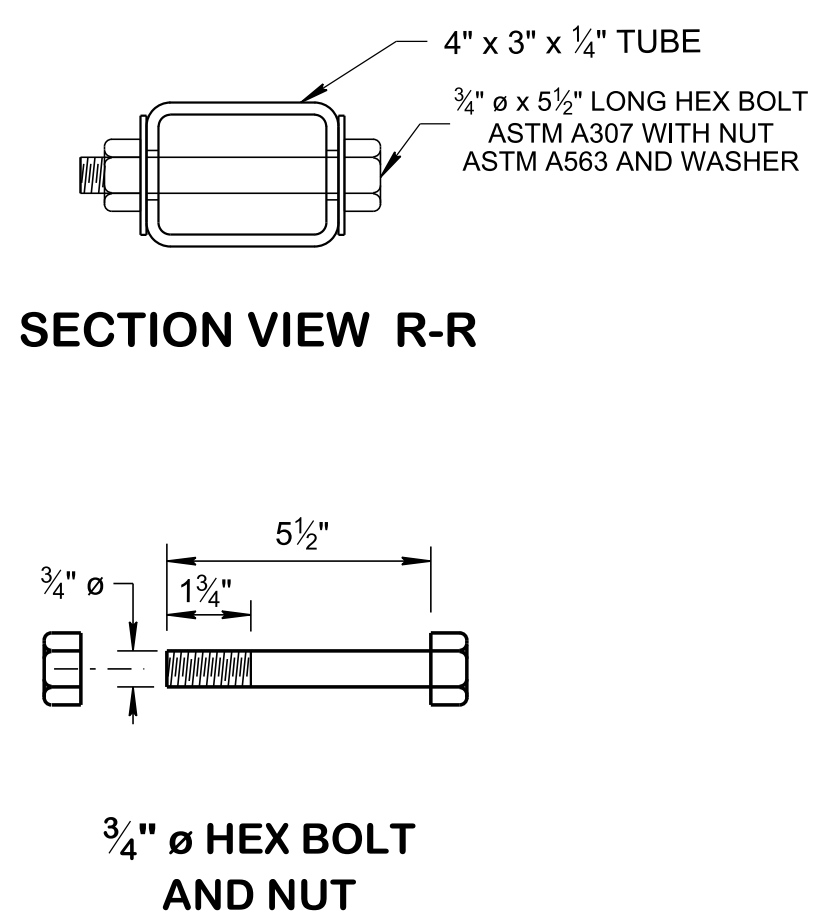
DETAIL P SLIP BASE DETAIL

QUANTITIES (PER EACH POST)				
FOOTING LOCATION	DIAMETER (FT.)	DEPTH (FT.)	CONCRETE (C. Y.)	REINFORCING STEEL (LB.)
ANCHOR # 2	1'-0"	3'-10"	0.112	16.29

BILL OF STEEL				
BAR TYPE	BAR SIZE	NUMBER REQUIRED	LENGTH	REINFORCING STEEL (LB.)
A300	3	4	3'-6"	5.26
T300	3	11	2'-8"	11.03



DETAIL R FOR 4" x 3" x 1/4" TUBE POST SLEEVE



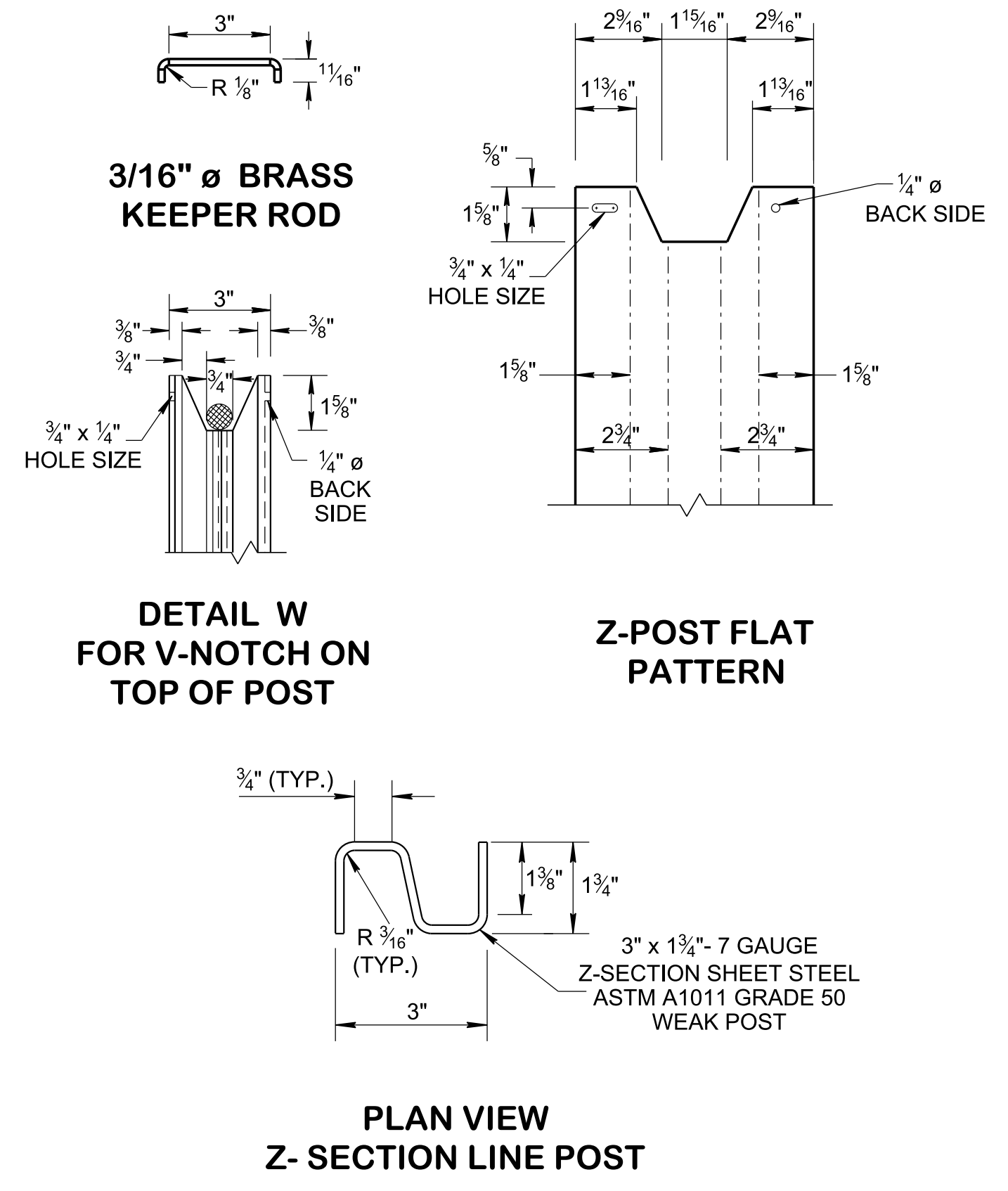
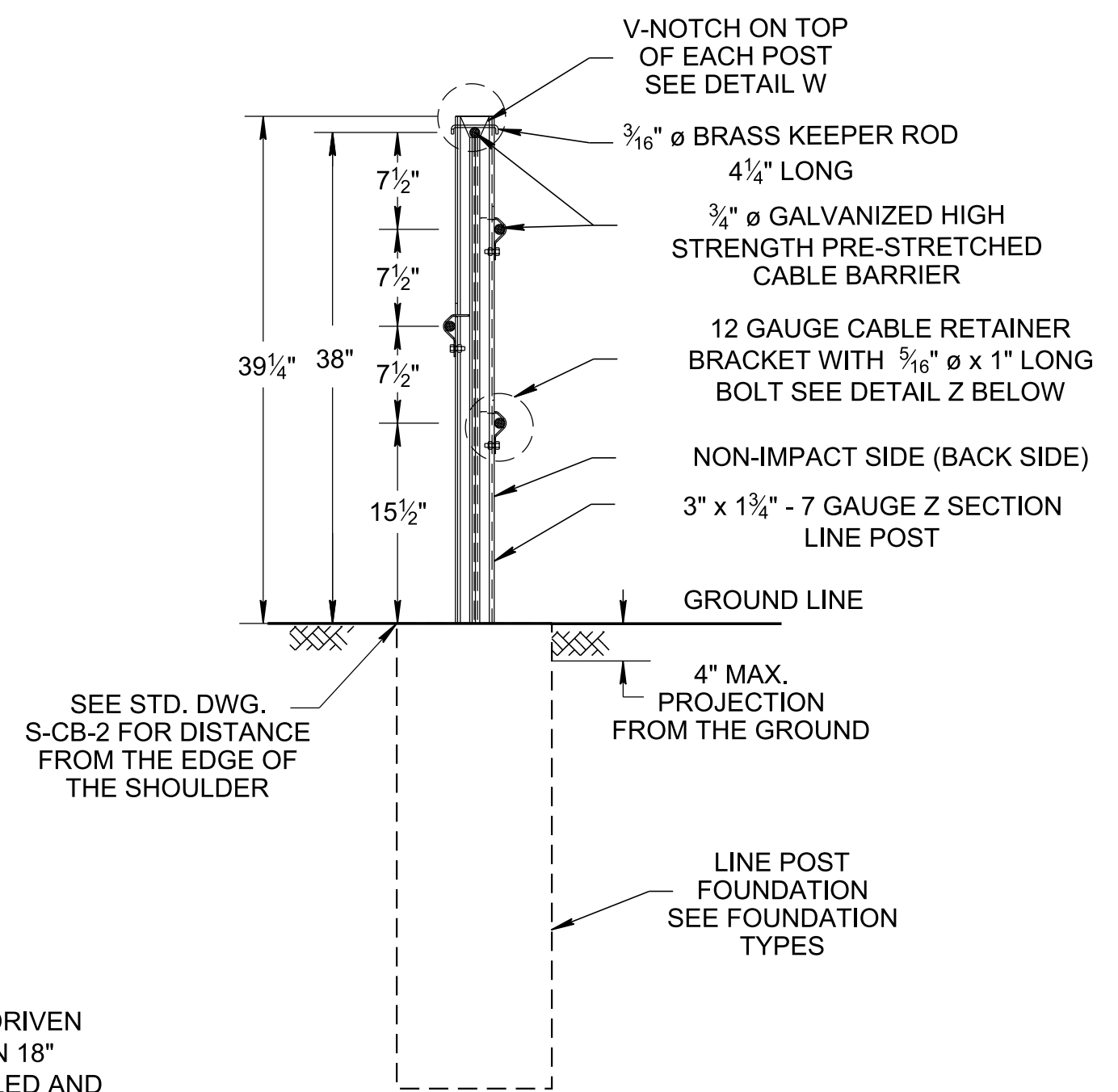
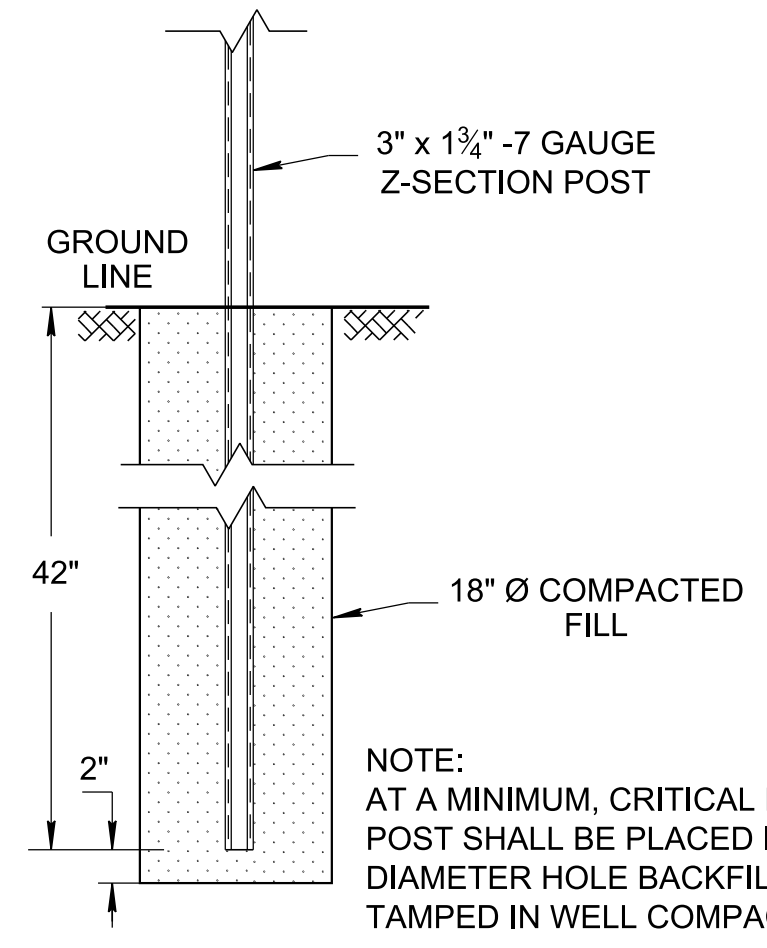
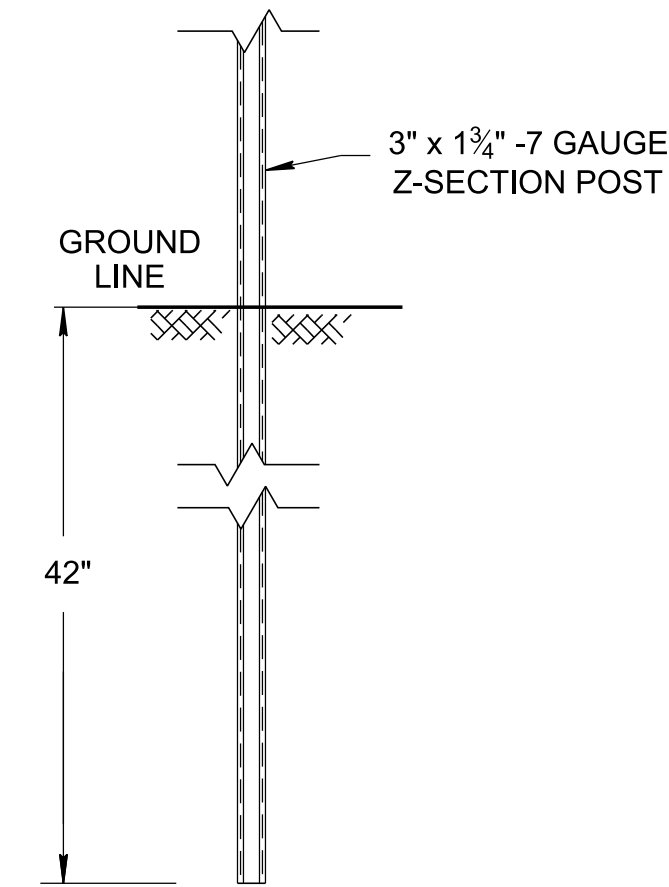
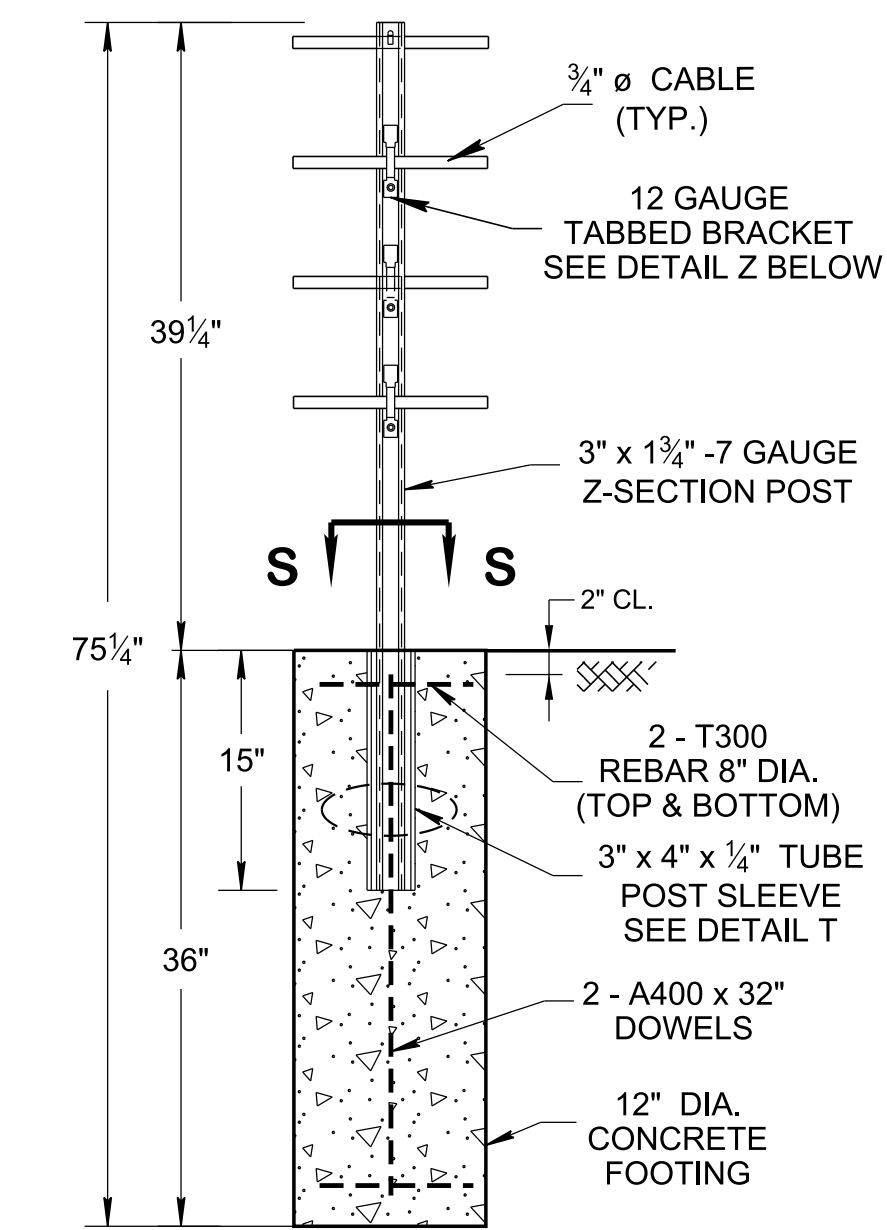
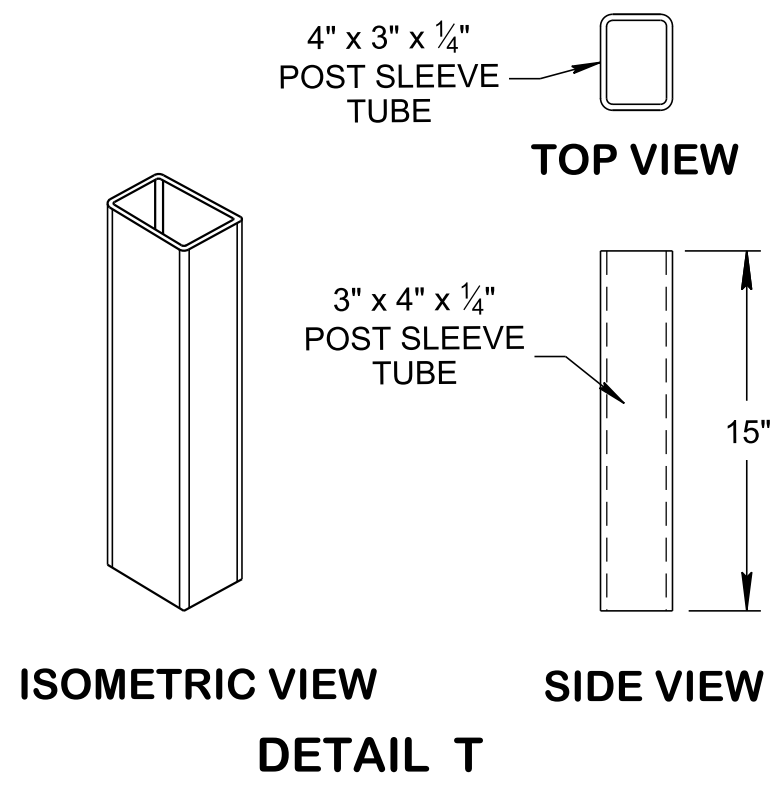
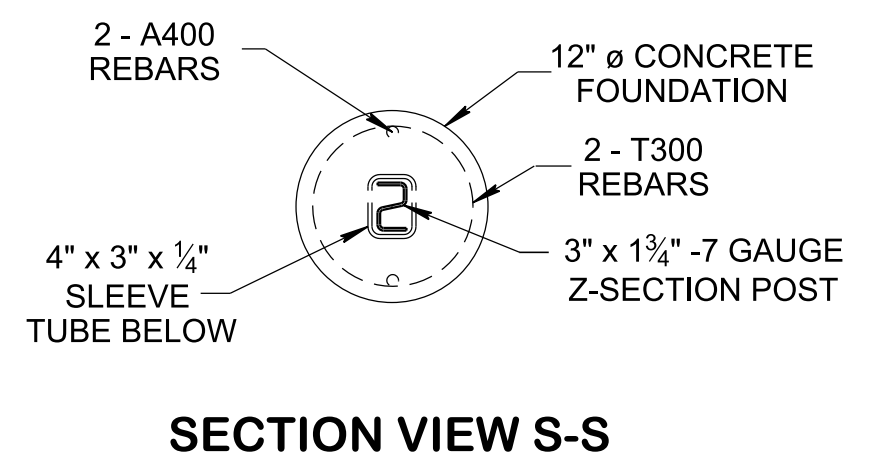
SECTION VIEW R-R

GENERAL NOTES

- (A) CABLE BARRIER ANCHOR CONCRETE FOUNDATION SHALL BE CONSTRUCTED WITH CLASS 'A' CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI, AND MIXED IN ACCORDANCE WITH SECTION 604 OF THE STANDARD SPECIFICATIONS.
- (B) CONCRETE FOUNDATION REINFORCING STEEL: TO BE ASTM A615. PLACE ALL STEEL REINFORCEMENT 2" MINIMUM FROM OUTSIDE FACE OF WALL, EXCEPT AS OTHERWISE SHOWN. ALL REINFORCING STEEL BARS ARE TO BE EPOXY COATED MEETING ALL REQUIREMENTS OF ASTM D3963.
- (C) SECOND POSTS SHALL BE S3x5.7 CONFORM TO ASTM A992 GRADE 50, AND GALVANIZED. ALL TUBES SHALL CONFORM TO ASTM A500 GRADE B AND BE GALVANIZED. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
- (D) ALL WELDING SHALL BE PERFORMED BY A WELDER QUALIFIED IN ACCORDANCE WITH THE AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION).
- (E) REFER TO STANDARD DRAWINGS S-CB-2, S-CB-3, S-CB-3A AND S-CB-5 FOR CABLE BARRIER DETAILS.
- (F) THE DETAILS SHOWN ON THIS DRAWING ARE BASED ON RESULTS OF FULL SCALE CRASH TESTS TO MASH TEST 3-11. REFER TO ENGINEER SHOP DRAWINGS FOR DETAILS NOT SHOWN ON THIS DRAWING.
- (G) NON-PROPRIETARY HIGH TENSION CABLE MEDIAN BARRIER HAS BEEN EVALUATED BY THE MIDWEST ROADSIDE SAFETY FACILITY AND MEETS MASH TL-3 STANDARDS, AND THE EVALUATION HAS BEEN DOCUMENTED IN THE MIDWEST ROADSIDE MIDWEST STATES POOLED FUND RESEARCH REPORT NO. TRP-03-327-16.
- (H) THE FOUNDATION DESIGN IS BASED ON UNCLASSIFIED IN SITU SOIL ASSUMED TO BE COMPACTED. IF SOIL DOES NOT MEET COMPACTION, THE INSTALLER SHALL SUBMIT AN ALTERNATIVE FOUNDATION DESIGN FOR APPROVAL, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TN. ALL ALTERNATIVE DESIGNS SUBMITTED SHALL SHOW THE FOUNDATION DIMENSIONS AND STEEL REINFORCEMENT.
- (I) PAYMENT: FURNISHING AND INSTALLING CONCRETE ANCHOR FOUNDATIONS, POSTS, POST ASSEMBLIES, SQUARE TUBE, HARDWARE INCLUDING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES SHALL BE PAID UNDER ITEM 705-06.41 CABLE BARRIER ANCHOR (MASH TL-3) EACH.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

CABLE BARRIER ANCHOR POST # 2 DETAILS



SOCKETED CONCRETE FOOTING TYPE I
(USE AT LOCATIONS WITH WEAK SOIL)

DRIVEN IN STRONG SOIL TYPE II
(USE AT LOCATIONS WITH STRONG SOIL)

DRIVEN IN WEAK SOIL TYPE III
(USE AT LOCATIONS WITH WEAK SOIL)

SIDE VIEW LINE POST TOP DETAIL

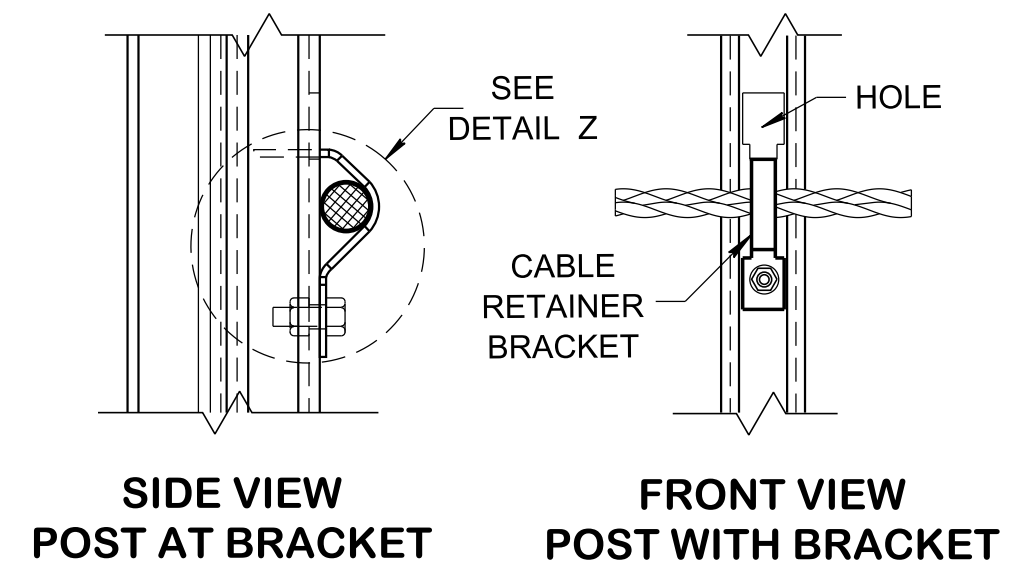
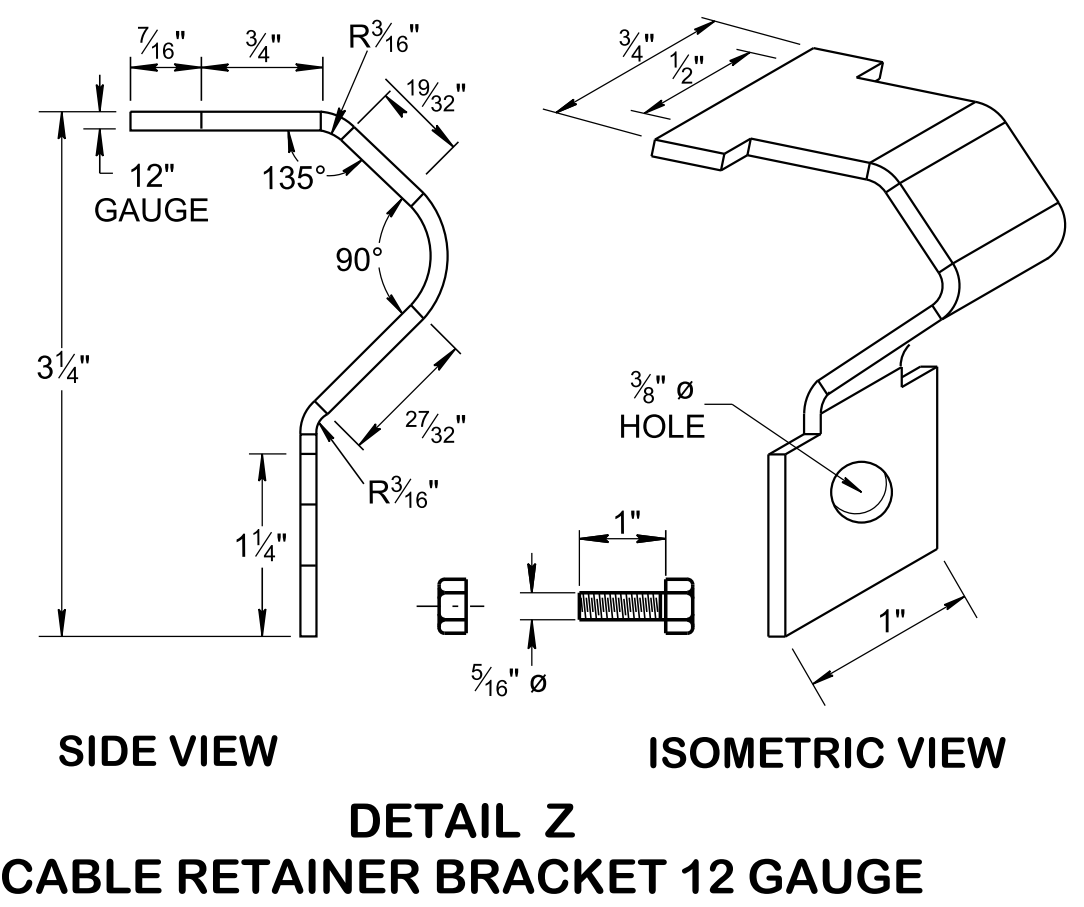
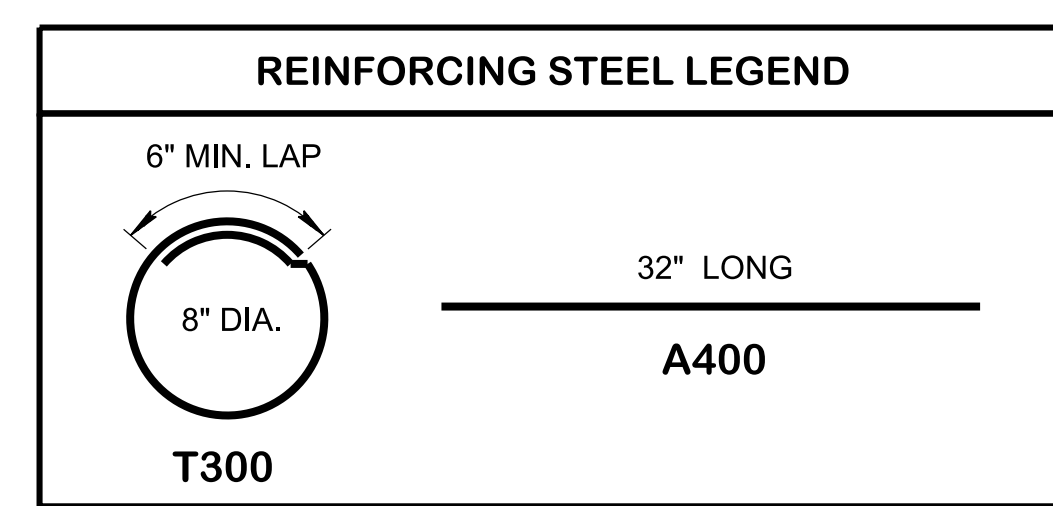
REAR VIEW LINE POST FOUNDATION TYPES

GENERAL NOTES

- (A) CABLE BARRIER ANCHOR CONCRETE FOUNDATION SHALL BE CONSTRUCTED WITH CLASS 'A' CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI, AND MIXED IN ACCORDANCE WITH SECTION 604 OF THE STANDARD SPECIFICATIONS.
- (B) CONCRETE FOUNDATION REINFORCING STEEL: TO BE ASTM A615. PLACE ALL STEEL REINFORCEMENT 2" MINIMUM FROM OUTSIDE FACE OF WALL, EXCEPT AS OTHERWISE SHOWN. ALL REINFORCING STEEL BARS ARE TO BE EPOXY COATED MEETING ALL REQUIREMENTS OF ASTM D3963.
- (C) ALL TUBES SHALL CONFORM TO ASTM A500 GRADE B AND BE GALVANIZED. ALL LINE POSTS SHALL BE Z-SECTION 3"x1 3/4" 7 GAUGE SHEET STEEL ASTM A1011 GRADE 50. ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
- (D) ALL WELDING SHALL BE PERFORMED BY A WELDER QUALIFIED IN ACCORDANCE WITH THE AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION).
- (E) REFER TO STANDARD DRAWINGS S-CB-2, S-CB-3, S-CB-3A AND S-CB-4 FOR CABLE BARRIER DETAILS.
- (F) THE DETAILS SHOWN ON THIS DRAWING ARE BASED ON RESULTS OF FULL SCALE CRASH TESTS TO MASH TEST 3-11. REFER TO ENGINEER SHOP DRAWINGS FOR DETAILS NOT SHOWN ON THIS DRAWING.
- (G) NON-PROPRIETARY HIGH TENSION CABLE MEDIAN BARRIER HAS BEEN EVALUATED BY THE MIDWEST ROADSIDE SAFETY FACILITY AND MEETS MASH TL-3 STANDARDS, AND THE EVALUATION HAS BEEN DOCUMENTED IN THE MIDWEST ROADSIDE MIDWEST STATES POOLED FUND RESEARCH REPORT NO. TRP-03-327-16.
- (H) THE CONCRETE FOUNDATION DESIGN IS BASED ON UNCLASSIFIED IN SITU SOIL ASSUMED TO BE COMPACTED. IF SOIL DOES NOT MEET COMPACTION, THE INSTALLER SHALL SUBMIT AN ALTERNATIVE FOUNDATION DESIGN FOR APPROVAL, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TN. ALL ALTERNATIVE DESIGNS SUBMITTED SHALL SHOW THE FOUNDATION DIMENSIONS AND STEEL REINFORCEMENT.
- (I) ROCK CLAUSE: WHERE SOLID ROCK IS ENCOUNTERED:
 - A FOR SOCKETED POST, CONTINUE DIGGING 12" DIAMETER, 15" DEEP INTO ROCK OR THE REQUIRED PLAN DEPTH, WHICHEVER COMES FIRST.
 - B FOR DRIVEN POST, CORE DRILL A 4" DIAMETER HOLE 18" DEEP INTO ROCK OR THE REQUIRED PLAN DEPTH, WHICHEVER COMES FIRST.
- (J) PAYMENT: FURNISHING AND INSTALLING FOUNDATIONS, POSTS, POST ASSEMBLIES, SQUARE TUBE, HARDWARE INCLUDING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES SHALL BE PAID UNDER ITEM NUMBERS 705-06.40 CABLE BARRIER (MASH TL-3) L.F.

QUANTITIES (PER EACH POST)				
FOOTING LOCATION	DIAMETER (FT.)	DEPTH (FT.)	CONCRETE (C. Y.)	REINFORCING STEEL (LB.)
LINE POST	1'-0"	3'-0"	0.087	5.56

BILL OF STEEL				
BAR TYPE	BAR SIZE	NUMBER REQUIRED	LENGTH	REINFORCING STEEL (LB.)
T300	3	2	2'-8"	2.00
A400	4	2	2'-8"	3.56



DETAIL Z CABLE RETAINER BRACKET 12 GAUGE

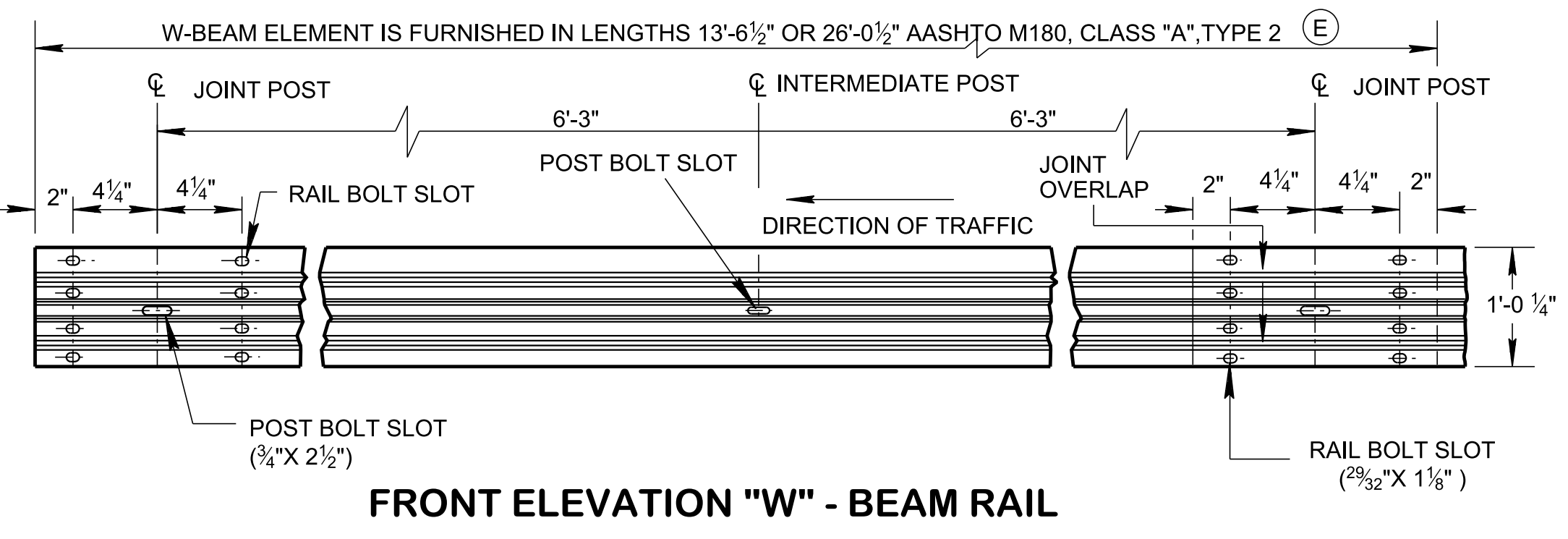
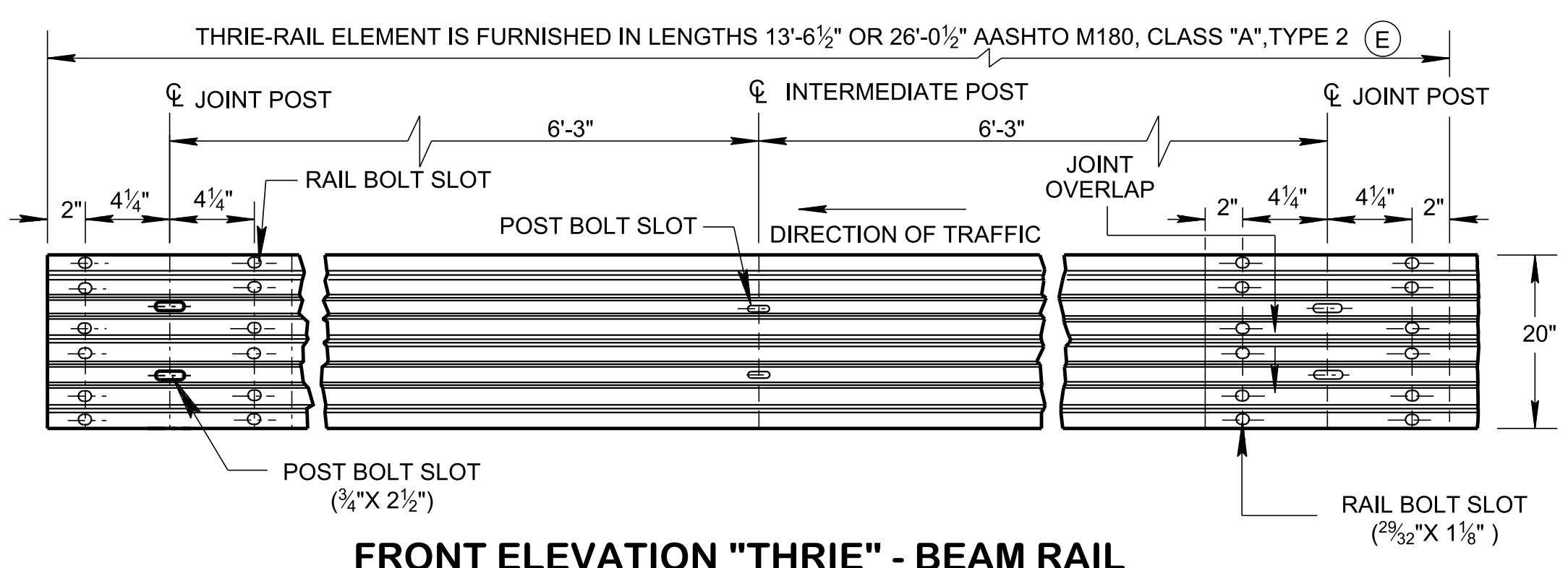
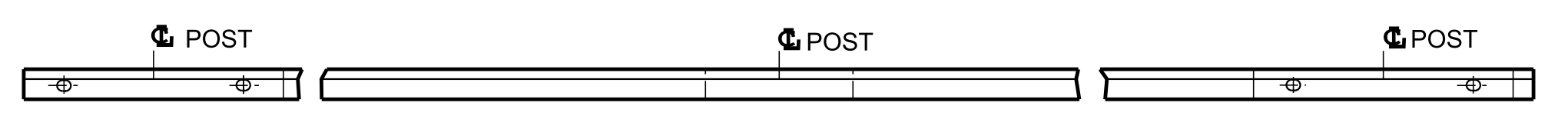
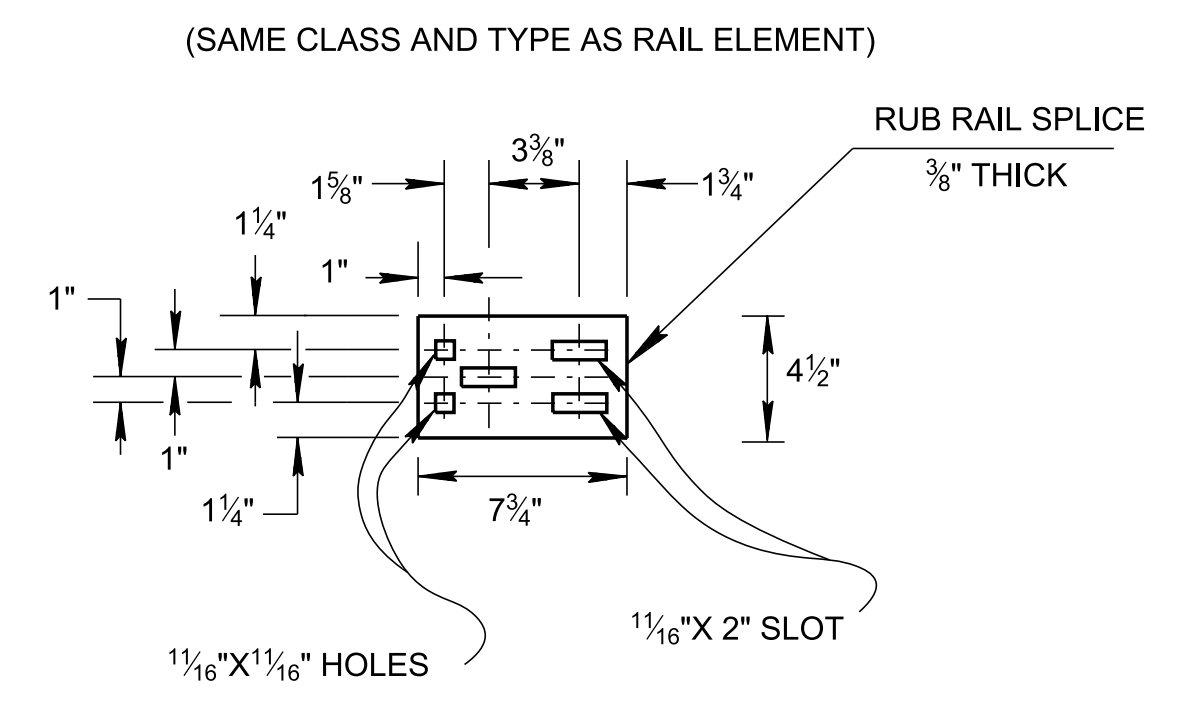
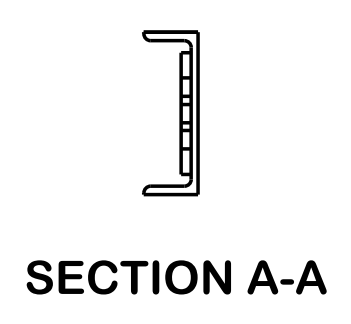
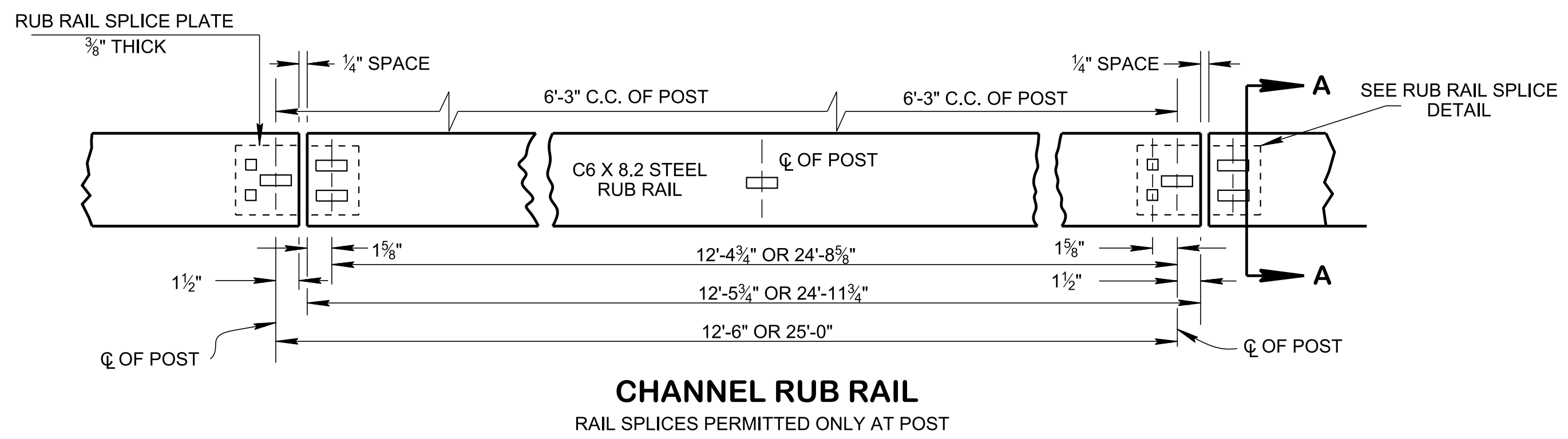
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

**CABLE BARRIER
LINE POST
DETAILS**

7/16/2021 3:10:55 PM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.10 Guardrail Maintenance IP\SGR281M-2021

REV. 06-28-19: CHANGED DRAWING NO. AND REDREW SHEET.
REV. 06-15-21: REVISED NOTE (A) AND ADDED NOTE (F).

THIS DRAWING IS TO BE USED FOR RESURFACING, MAINTENANCE, AND BRIDGE REPAIR PROJECTS ONLY, THIS DRAWING IS NOT INTENDED TO BE USED FOR NEW CONSTRUCTION OR RECONSTRUCTION PROJECTS.



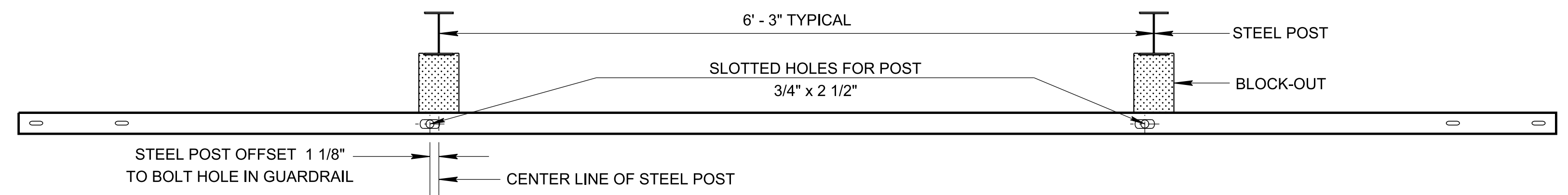
GENERAL NOTES		
(A)	CORRUGATED SHEET STEEL BEAMS SHALL CONFORM TO THE CURRENT REQUIREMENTS OF AASHTO M180 CLASS "A"; TYPE II OR TYPE VI. RAIL MATERIAL SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KIPS PER SQUARE INCH AND A TENSILE STRENGTH OF 70 KIPS PER SQUARE INCH.	
(B)	RUB RAILS AND RUB RAIL SPLICE PLATES SHALL CONFORM TO ASTM A36 AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.	
(C)	WHERE GUARDRAIL IS TO BE PLACED ON A CURVE WITH A RADIUS LESS THAN 150 FEET, THE RAIL SECTION SHALL BE SHOP-FORMED TO THE REQUIRED RADIUS.	
(D)	SEE THE "S-PL" STANDARD SERIES FOR GUARDRAIL PLACEMENT.	
(E)	ITEM NUMBERS FOR PAYMENT AS DETAILED ON THESE "S-GR" SERIES OF DRAWINGS ARE AS FOLLOWS:	
	ITEM NO. DESCRIPTION	
	705-02.01 SINGLE GUARDRAIL WITH RUB-RAIL (TYPE 2)	PER L.F.
	705-02.02 SINGLE GUARDRAIL (TYPE 2)	PER L.F.
	706-06.01 SINGLE THRIE RAIL (TYPE 2)	PER L.F.
(F)	SUBSTITUTING TYPE II WITH TYPE VI IS ACCEPTABLE.	

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

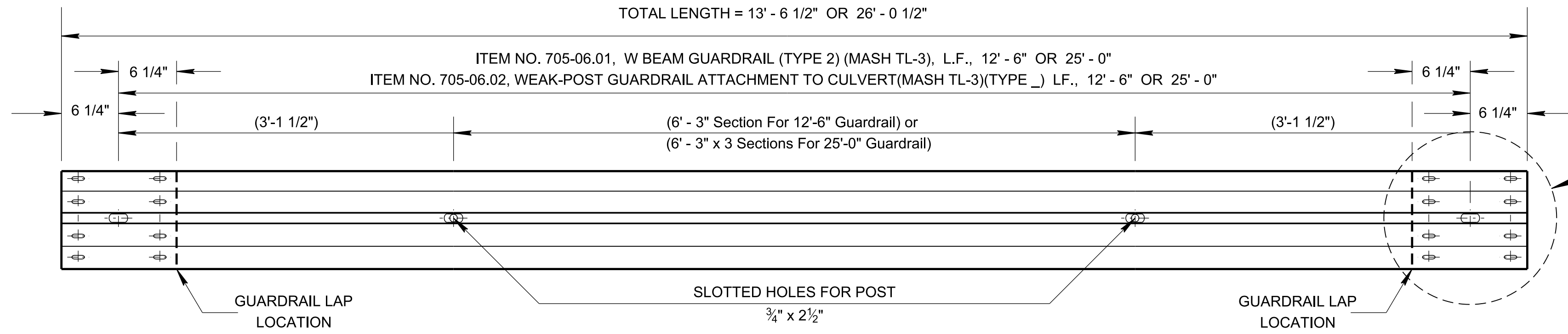
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

W-BEAM &
THRIE BEAM
BARRIER RAIL
AND RUB RAIL
DETAILS

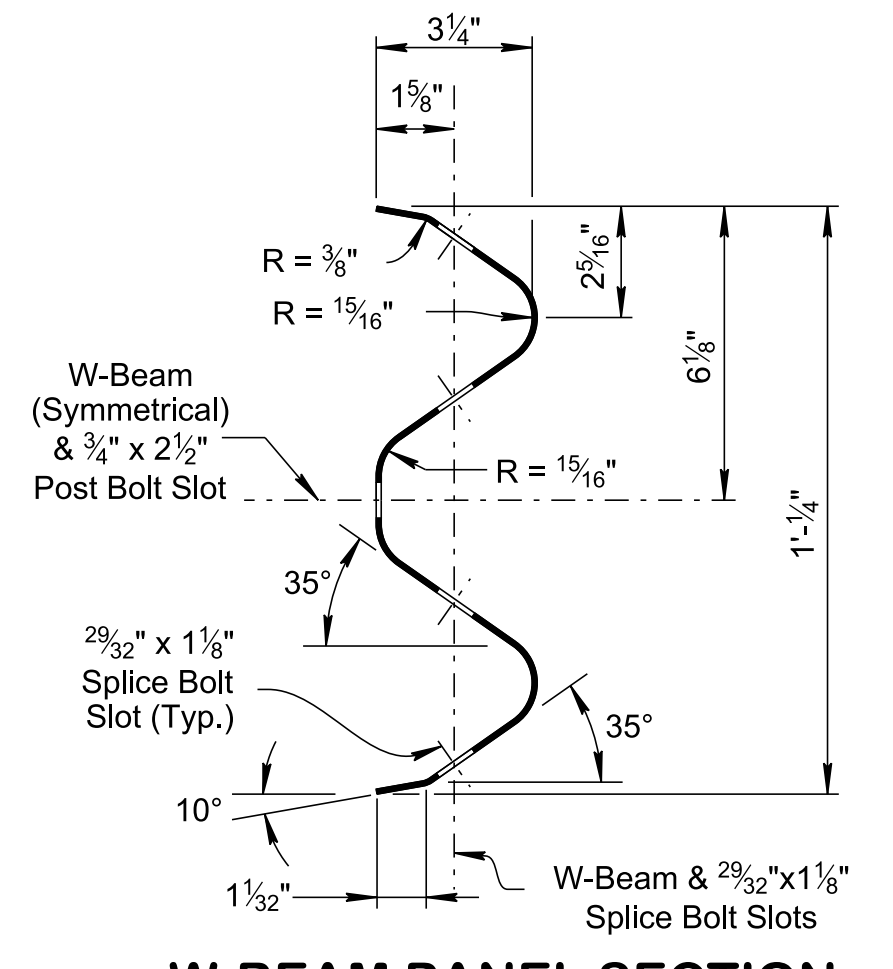
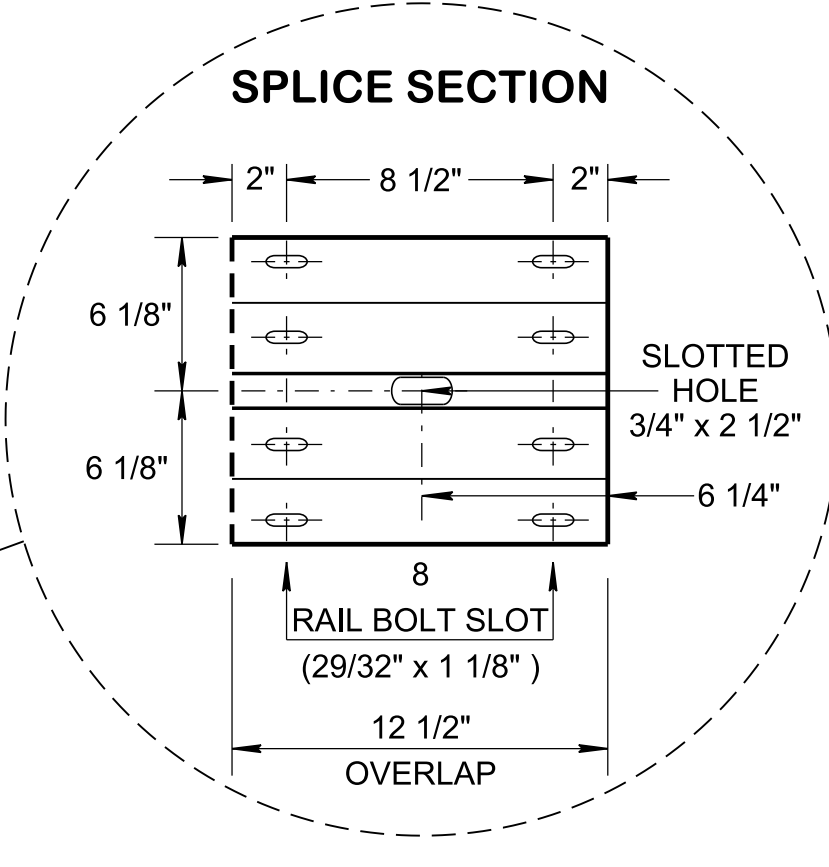
7/16/2021 1:43:01 PM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.04 Guardrail Details IPISGR311-20210615.dwg



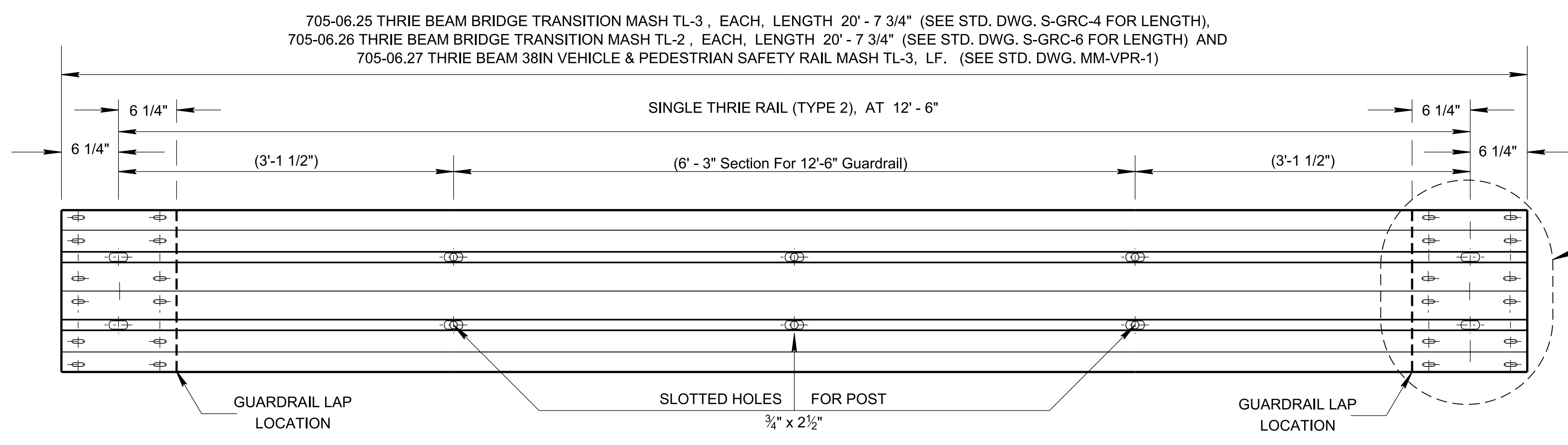
PLAN VIEW



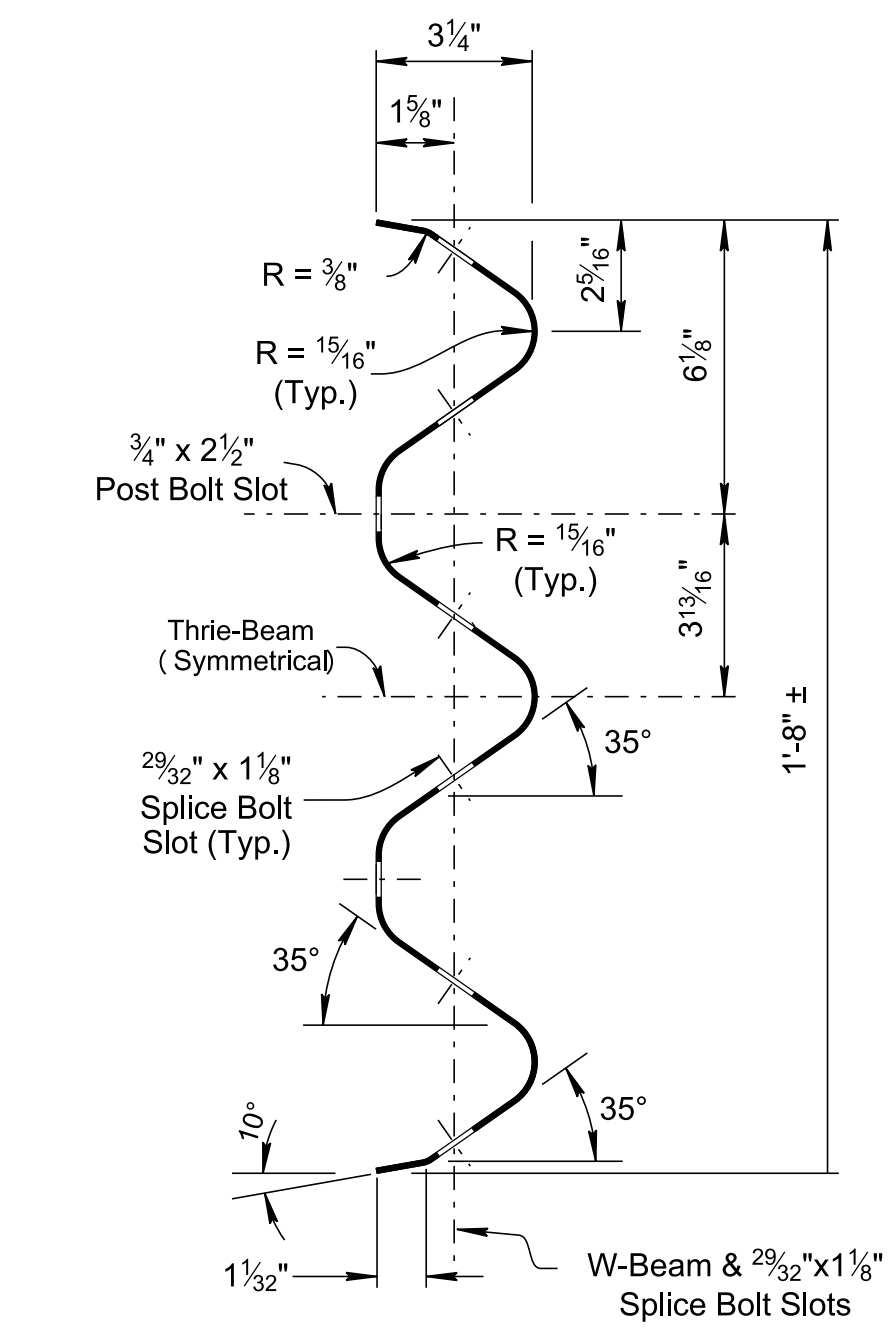
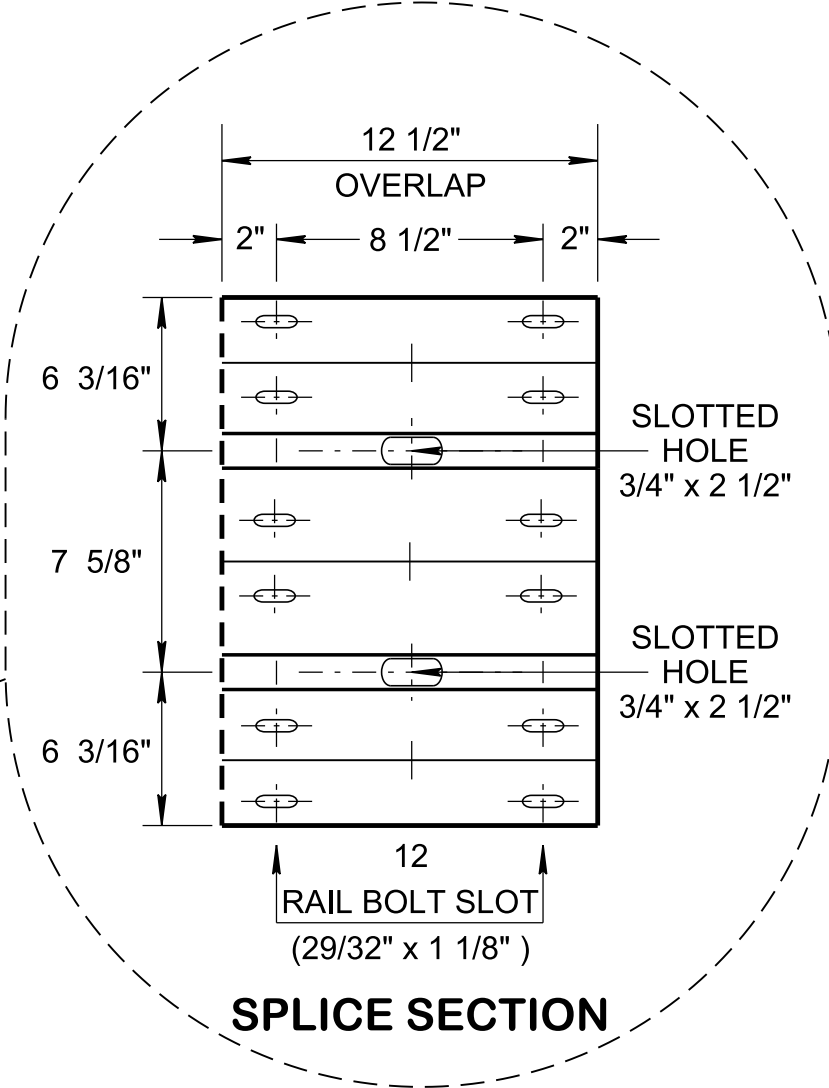
W-BEAM 12 GAUGE FRONT ELEVATION



W-BEAM PANEL SECTION



THRIE-BEAM RAIL 12 GAUGE FRONT ELEVATION



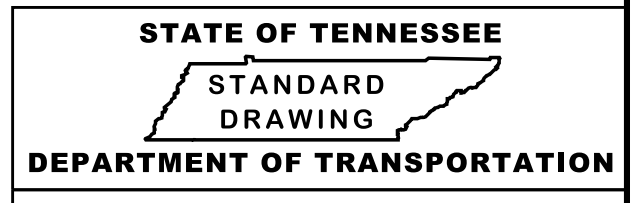
THRIE-BEAM PANEL SECTION

- REV. 12-01-14: REVISED NOTE (L)
- REV. 04-04-16: REVISED NOTES.
- REV. 10-20-16: ADDED NOTE TO ADDRESS ADDITIONAL HOLES.
- REV. 03-28-17: REMOVED NOTE (T) CHANGED PAY ITEM NUMBER. IMPROVED POST SIDE VIEWS AND FRONT ELEVATION VIEWS.
- REV. 06-28-19: MOVED GENERAL NOTES FOR POST, BLOCK-OUTS, FUTURE ADJUSTMENTS, END TREATMENTS, DESIGN AND PAYMENT ALONG WITH GUARDRAIL POST TO STD. DWG. NO. S-GR31-1C. ADDED NEW GUARDRAIL DETAILS. RENAMED AND REDREW SHEET.
- REV. 06-15-21: REVISED NOTE (A) ADDED ITEM NUMBERS ON THRIE BEAM RAIL AND ON W BEAM. REMOVED PANEL SUMMARY TABLE.

GENERAL NOTES

- (A) METAL BEAMS SHALL CONFORM TO AASHTO M180 CLASS "A": TYPE II, OR TYPE VI.
- (B) WHERE GUARDRAIL IS PLACED ON A CURVE WITH A RADIUS LESS THAN 150 FEET, THE RAIL IS TO BE SHOP-FORMED TO THE REQUIRED RADIUS.
- (C) AT THE OPTION OF THE CONTRACTOR THE RAIL ELEMENTS FOR THE GUARDRAIL MAY BE FURNISHED IN EITHER 12'-6" OR 25' NOMINAL LENGTHS WITH POST BOLT SLOTS FOR CONNECTION TO POSTS.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

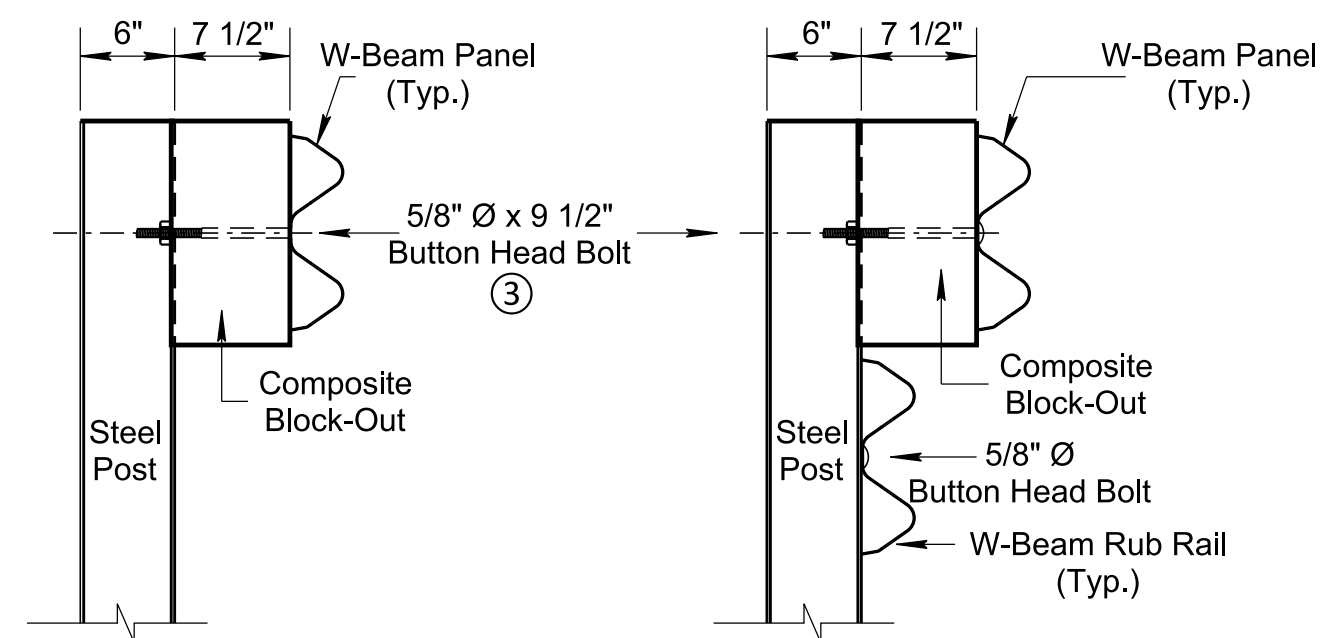


GUARDRAIL DETAILS

NOT TO SCALE

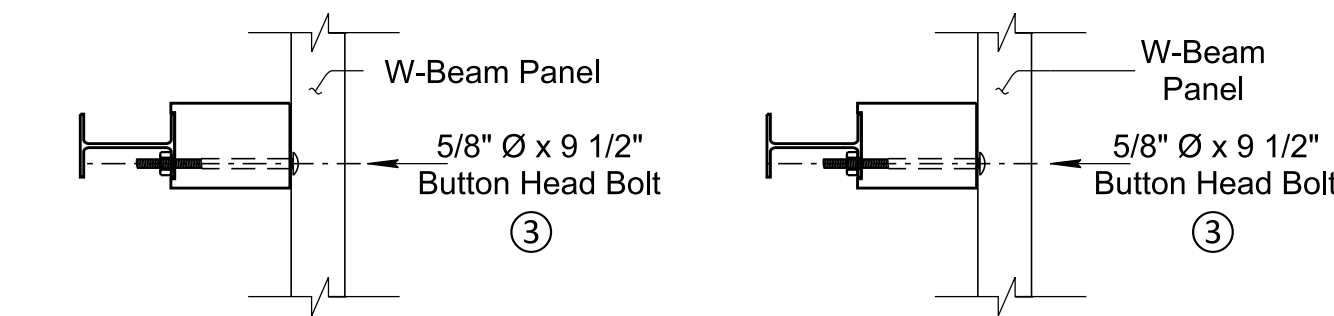
7/22/2021 11:27:29 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.04 Guardrail Details IPYISGR311C-20210615

STEEL POST GUARDRAIL DETAILS



Side View

Side View

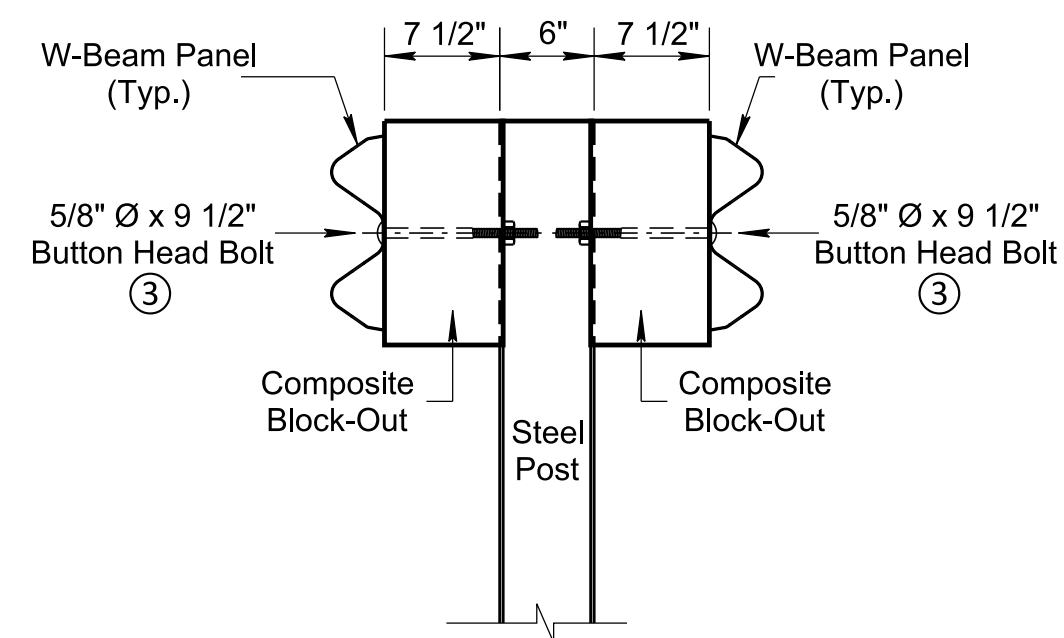


PLAN VIEW

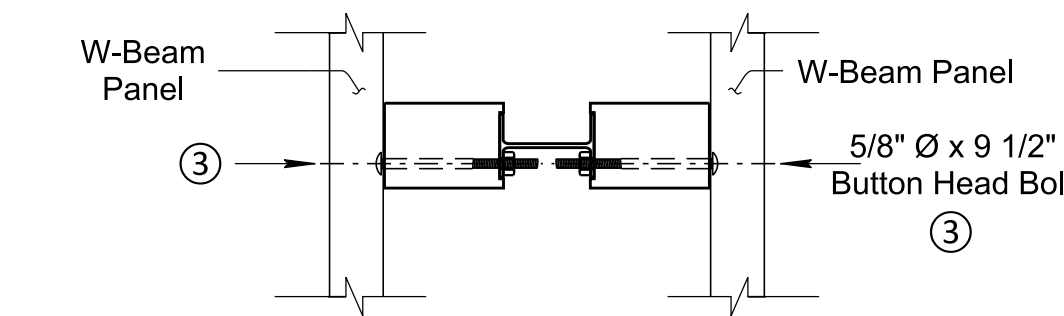
PLAN VIEW

SINGLE FACE W-BEAM WITH STEEL POST (Timber Post Similar)

SINGLE FACE W-BEAM WITH RUB RAIL AND STEEL POST (Timber Post Similar)

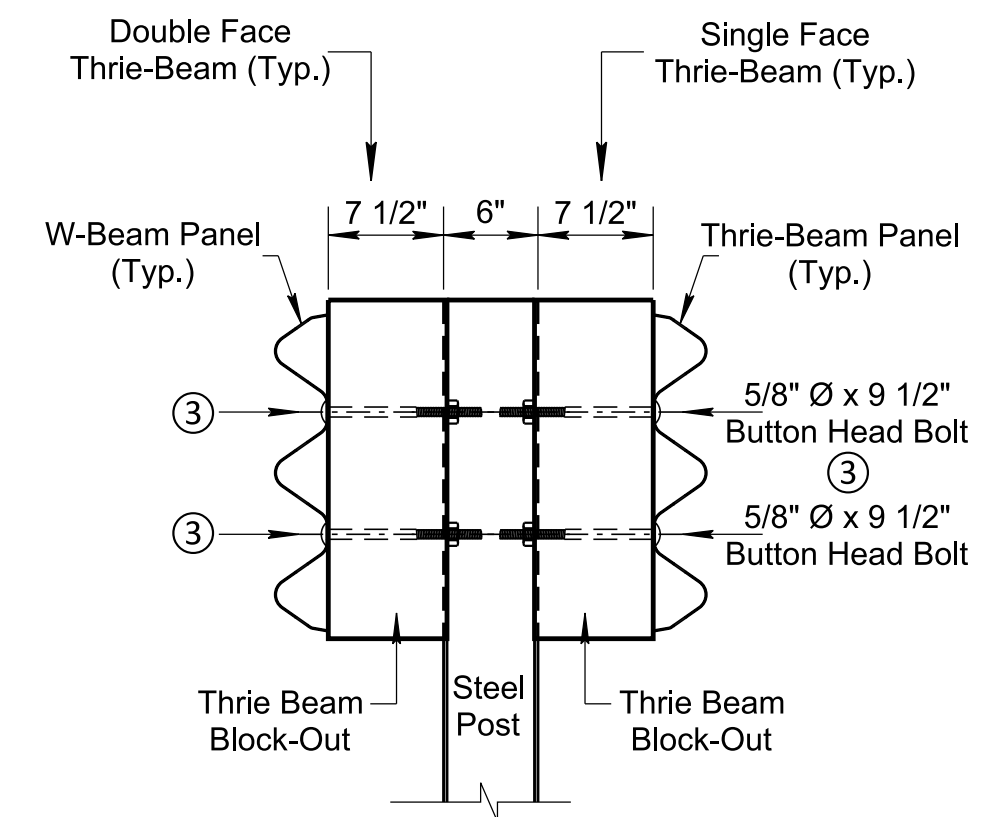


Side View

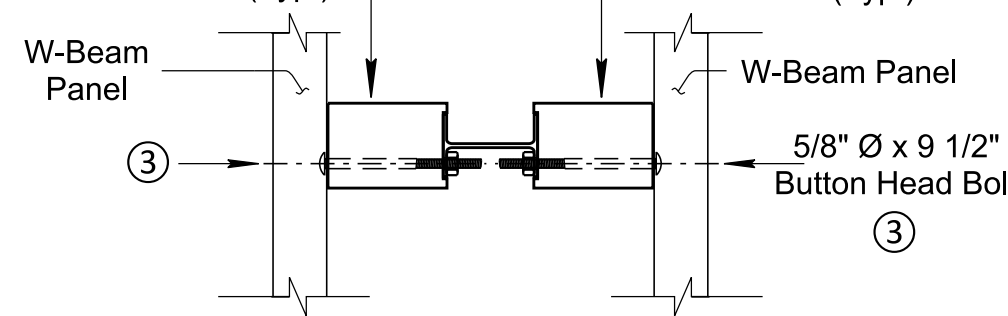


PLAN VIEW

DOUBLE FACE W-BEAM WITH STEEL POST (Timber Post Similar)

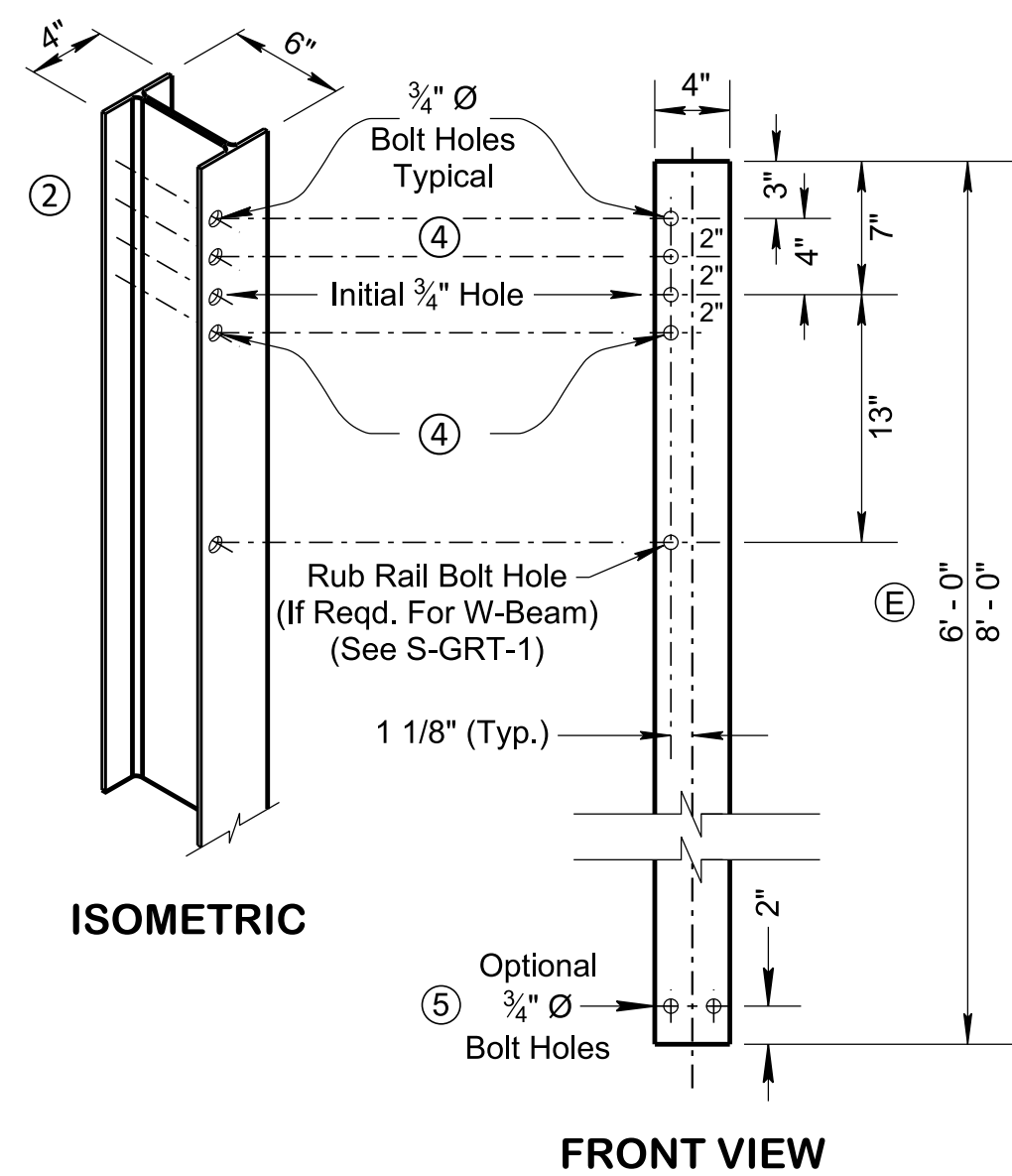


Side View



PLAN VIEW

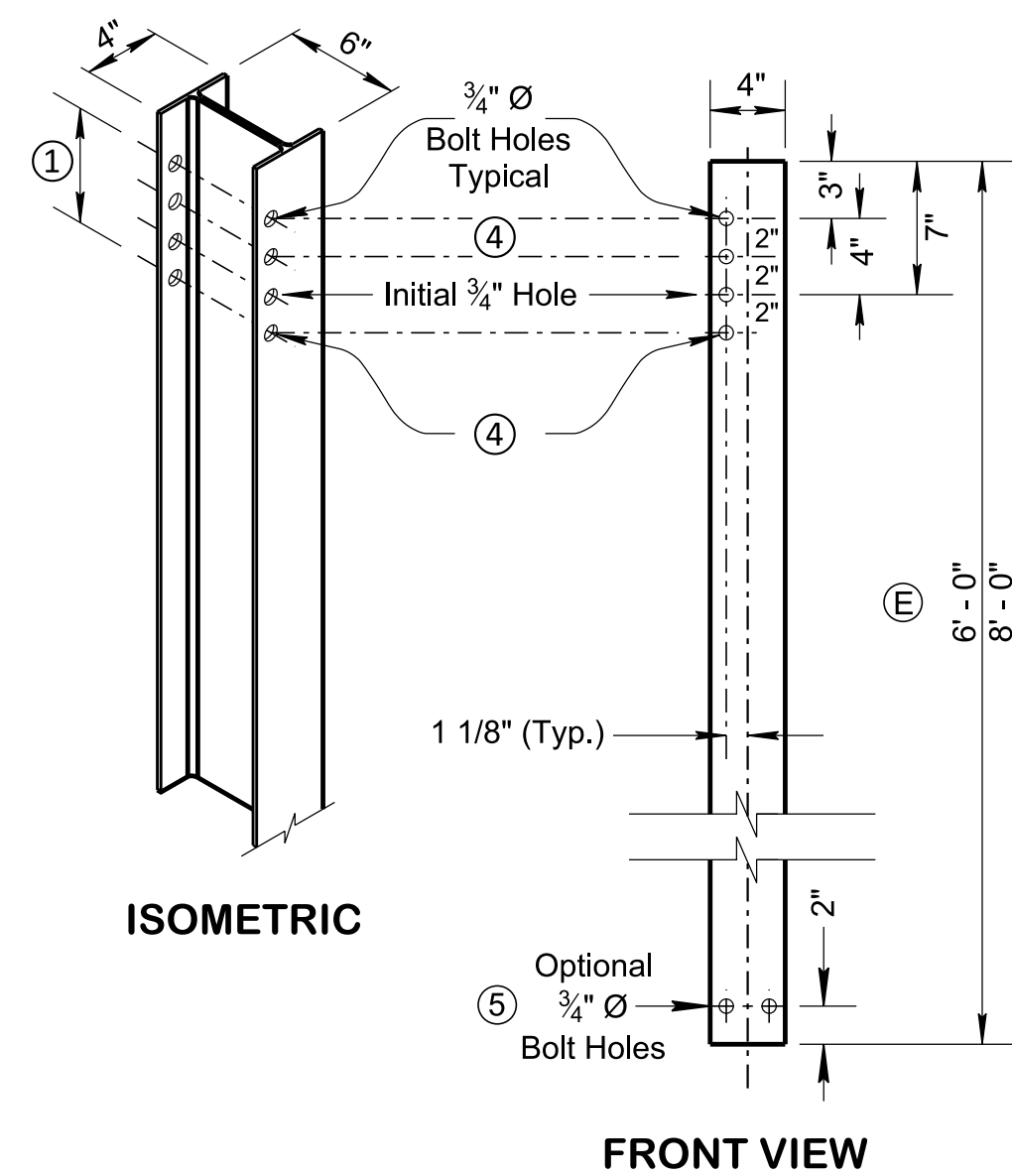
SINGLE/DOUBLE FACE THRIE-BEAM WITH STEEL POST (Timber Post Similar)



ISOMETRIC

FRONT VIEW

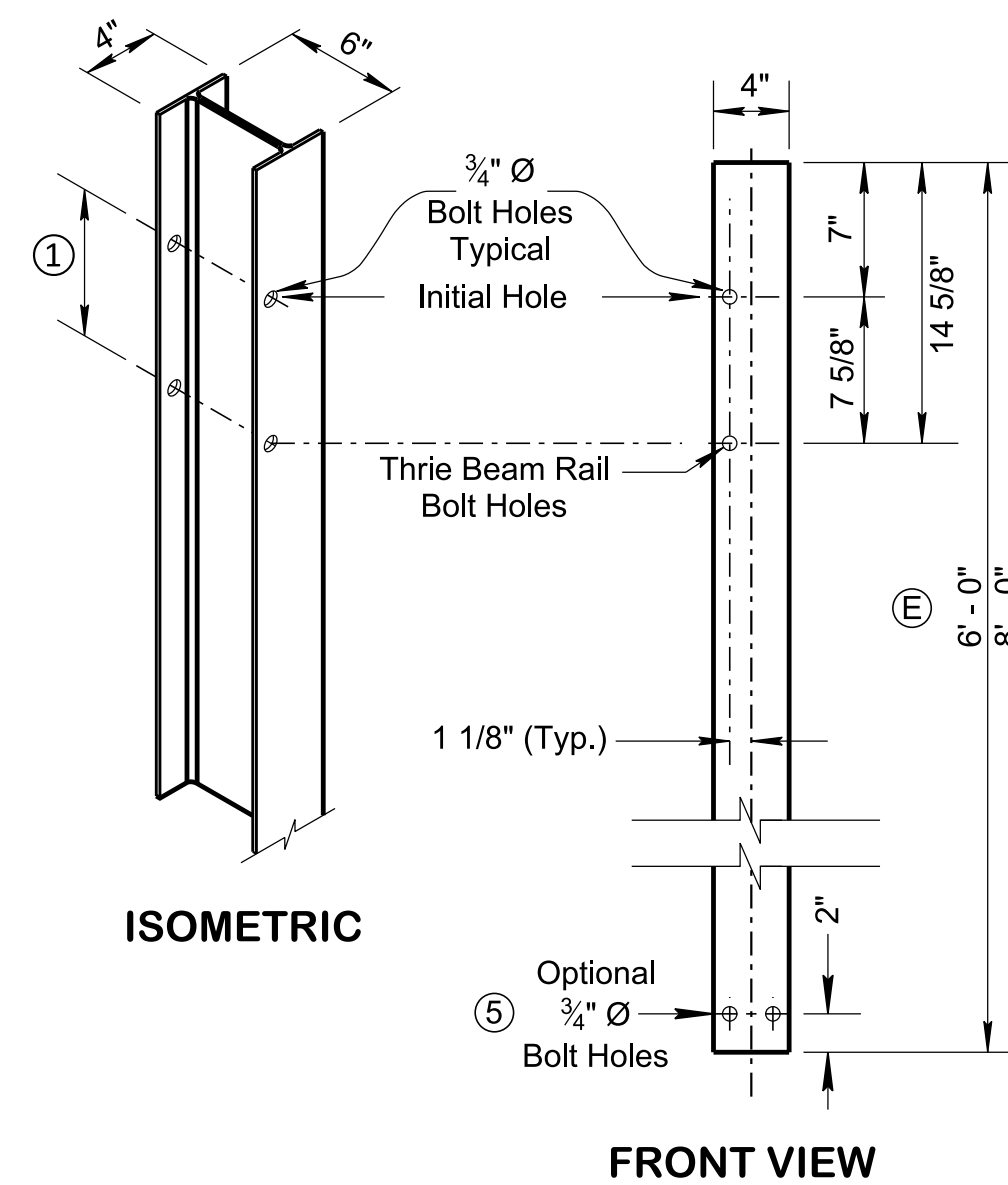
STEEL POST FOR SINGLE FACE W-BEAM RAIL WITH OPTIONAL RUB RAIL (If Required)



ISOMETRIC

FRONT VIEW

STEEL POST FOR DOUBLE FACE W-BEAM RAIL



ISOMETRIC

FRONT VIEW

STEEL POST FOR SINGLE AND DOUBLE FACE THRIE-BEAM

GENERAL NOTES

POST

- (A) THE CONTRACTOR MAY HAVE THE CHOICE OF EITHER HOT ROLLED OR WELDED STEEL W6 X 8.5 OR W6 X 9 OR 8" X 6" WOOD POST. EXCEPT AS NOTED:
 1. THE MIXING OF ANY POST TYPES ON A GIVEN PROJECT WILL BE AVOIDED IF AT ALL POSSIBLE.
 2. SHOULD IT BECOME NECESSARY TO MIX POST TYPES ON A GIVEN PROJECT POSTS SHALL NOT BE MIXED ON A SINGLE RUN OF GUARDRAIL EXCEPT AS NECESSARY AT END TERMINALS.
 3. W6 X 15 IS USED WITH GUARDRAIL CONNECTION TO STRUCTURES FOR MAINTENANCE ACTIVITIES ONLY.

- (B) STEEL POSTS SHALL CONFORM TO ASTM A36 AND BE GALVANIZED IN ACCORDANCE WITH ASTM A123. BOLT HOLES SHALL BE APPROXIMATELY CENTERED BETWEEN WEB AND EDGE OF FLANGE OF SPACERS AND POSTS.

- (C) WOOD POSTS SHALL CONFORM WITH TDOT CONSTRUCTION STANDARD SPECIFICATIONS.

- (D) WELDED STEEL POSTS SHALL CONFORM TO ASTM A769 AND BE GALVANIZED IN ACCORDANCE WITH ASTM A123, UNLESS OTHERWISE SPECIFIED ON THE PLANS.

- (E) SEE STANDARD DRAWING S-PL-6 FOR POST LENGTH REQUIREMENTS AND PAY ITEMS.

BLOCK-OUTS

- (F) BLOCK OUTS SHALL BE WOOD CONFORMING TO THE REQUIREMENTS OF TDOT CONSTRUCTION STANDARD SPECIFICATIONS OR PLASTIC GUARDRAIL BLOCK-OUTS LISTED ON THE TDOT QUALIFIED PRODUCT LIST.

- (G) ONLY WOODEN BLOCK-OUTS MAY BE USED WITH WOODEN POSTS, PLASTIC OR WOODEN BLOCK-OUTS MAY BE USED WITH STEEL POSTS.

- (H) ALL BLOCK-OUTS SHALL MEET MASH GUIDELINES AND NCHRP-350 GUIDELINES.

- (I) FOR BLOCK-OUT DETAILS SEE STANDARD DRAWING S-GR31-1A.

- (J) RECYCLED PLASTIC GUARDRAIL BLOCK-OUTS LISTED ON THE TENNESSEE DEPARTMENT OF TRANSPORTATION'S QUALIFIED PRODUCTS LIST MAY BE SUBSTITUTED FOR WOOD BLOCK-OUTS. THE USE OF RECYCLED PLASTIC GUARDRAIL BLOCK-OUTS ARE SUBJECT TO THE FOLLOWING STIPULATIONS:

1. THE MIXING OF BLOCK-OUTS ON A GIVEN PROJECT WILL BE AVOIDED IF POSSIBLE.
2. SHOULD IT BECOME NECESSARY TO CHANGE THE BLOCK-OUT TYPE ON A GIVEN PROJECT, THE BLOCK-OUTS SHOULD NOT BE MIXED ON A GIVEN RUN OF GUARDRAIL.

FUTURE ADJUSTMENTS

- (K) WOOD BLOCK OUTS SHALL HAVE ONE ADDITIONAL 3/4" HOLE, FOUR INCHES BELOW THE INITIAL HOLE FOR FUTURE ADJUSTMENT.

- (L) INITIAL INSTALLATION REQUIRES ONE BOLT CONNECTION, EACH ADJUSTMENT THEREAFTER REQUIRES TWO BOLT CONNECTIONS.

END TREATMENTS

- (M) ALL RUNS OF GUARDRAIL WILL BEGIN AND END WITH AN ANCHOR SYSTEM (SEE S-GRA-SERIES).

- (N) GUARDRAIL ENDS THAT ARE INSIDE THE CLEAR ZONE AND EXPOSED TO ONCOMING TRAFFIC SHALL HAVE A CRASH WORTHY END TERMINAL AS NOTED:

1. ANY ROAD WITH SUITABLE BACK SLOPES SHALL USE END TERMINALS BURIED IN BACK SLOPE (SEE S-GRT-1).
2. ALL HIGHWAY SYSTEM ROADS WITHOUT SUITABLE BACK SLOPES SHALL USE MASH TL-3 TANGENTIAL END TERMINALS (SEE S-GRT-2).
3. ALL OTHER ROADS WITH POSTED SPEED < 45 MPH SHALL USE MASH TL-2 END TERMINALS UNLESS OTHERWISE NOTED (SEE S-GRT-3).

DESIGN

- (O) 42 INCHES BEHIND GUARDRAIL SHALL BE CLEAR OF OBSTRUCTIONS FOR DEFLECTION.

- (P) REFER TO SAFETY PLAN STANDARDS FOR HOW TO DETERMINE THE LENGTH OF NEED.

- (Q) SEE STANDARD DRAWING S-GR31-1B FOR FASTENING HARDWARE DETAILS.

FOOTNOTES

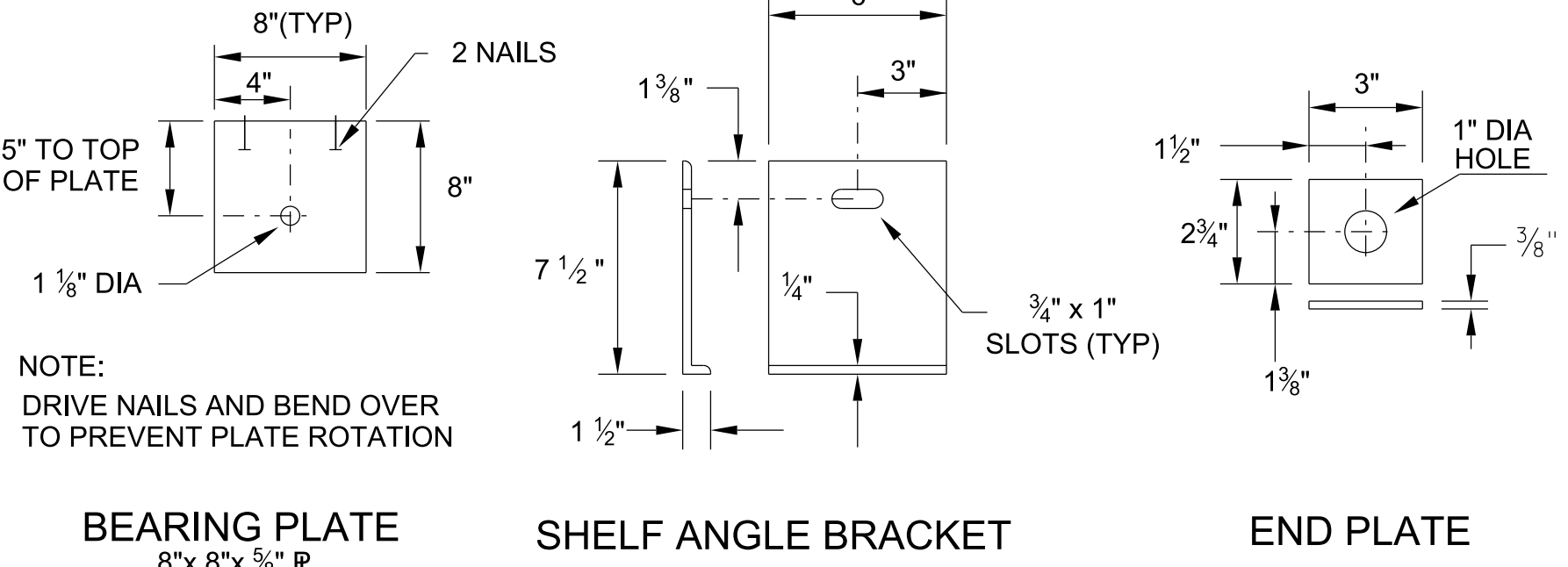
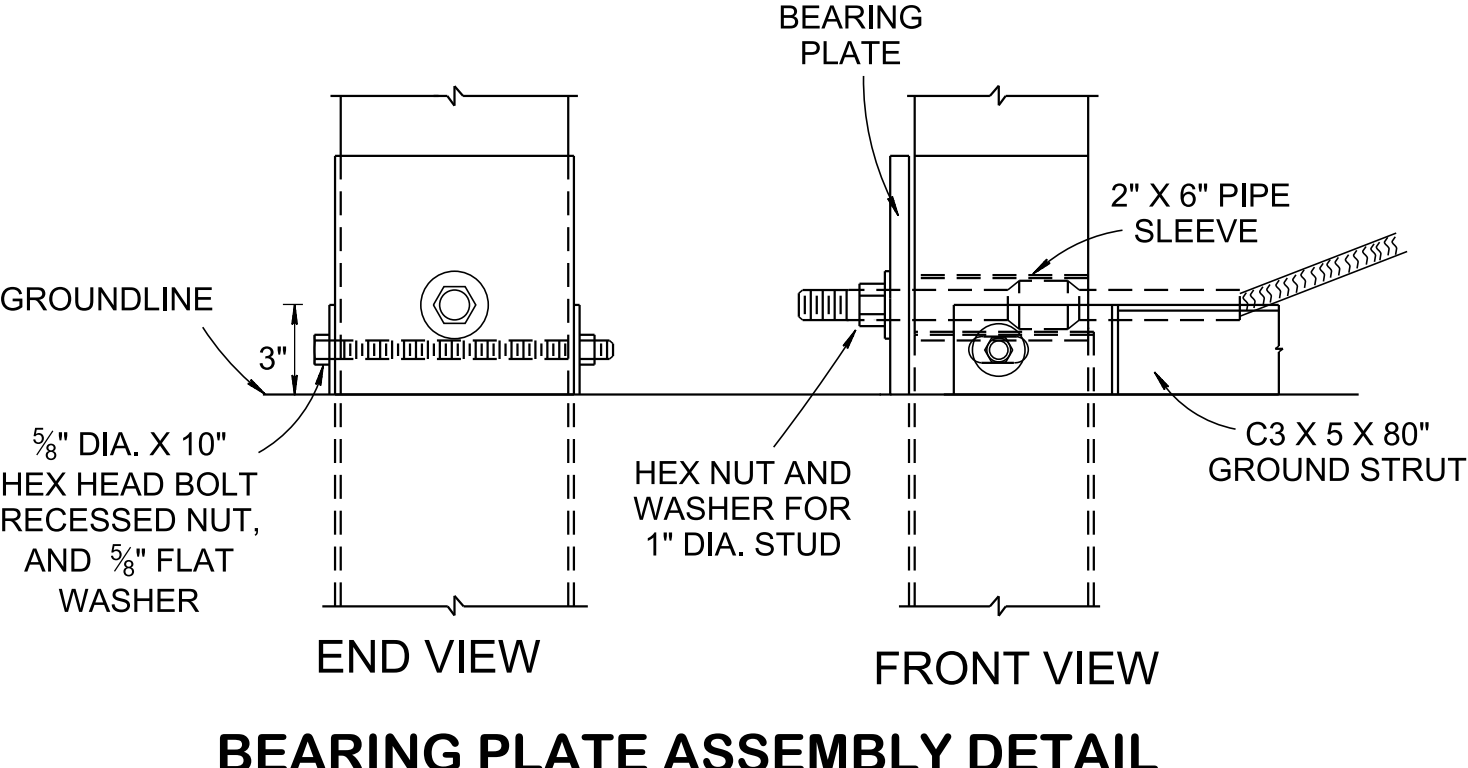
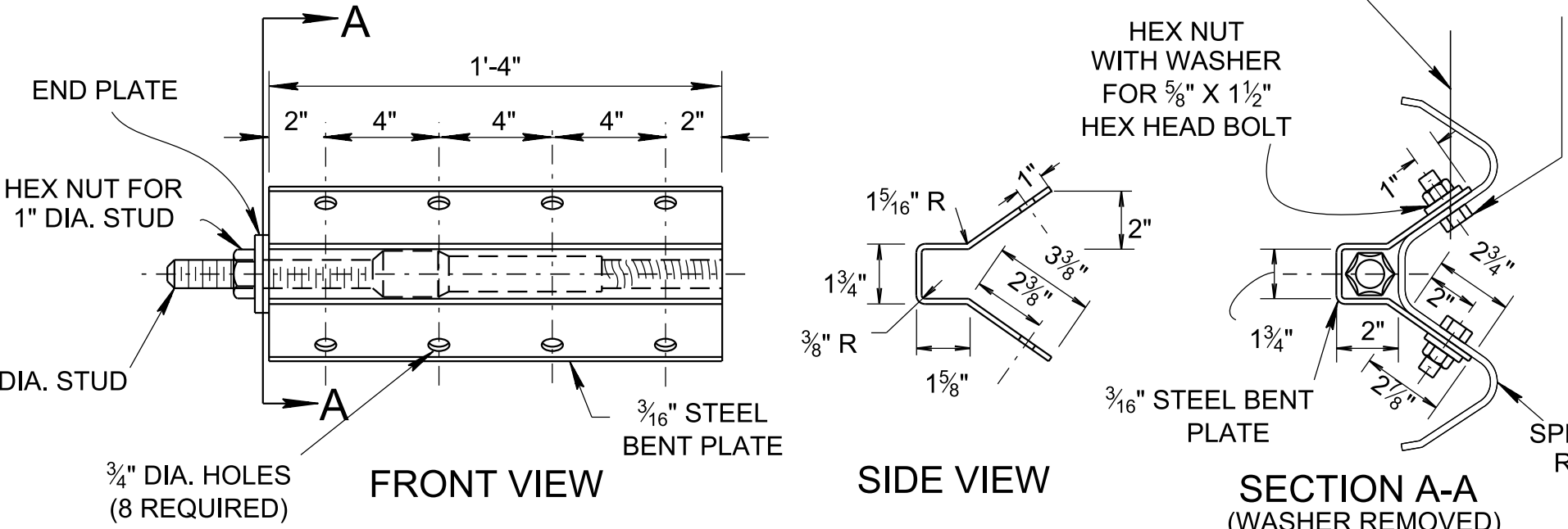
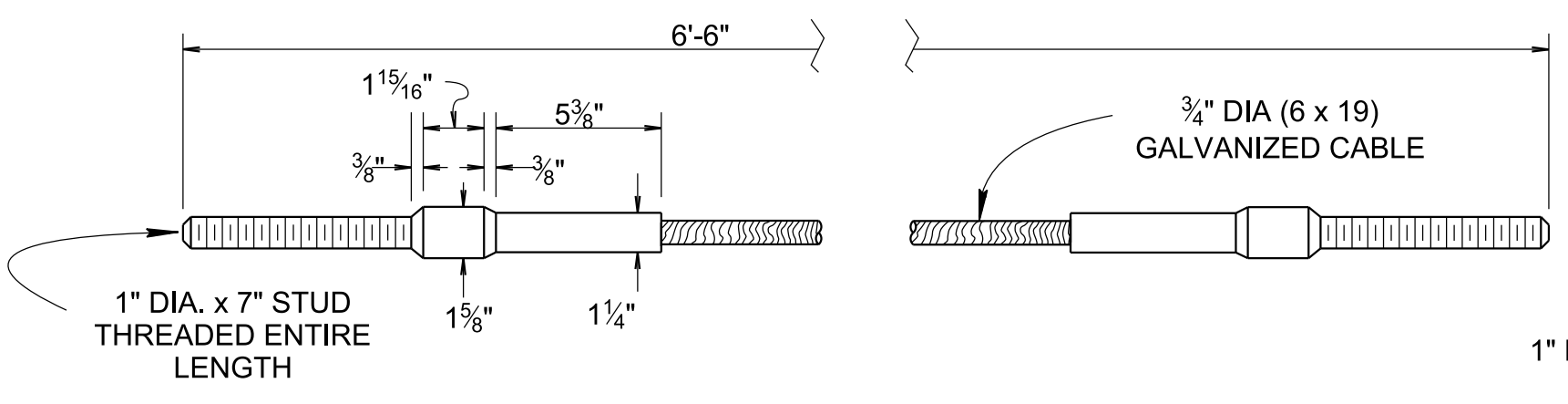
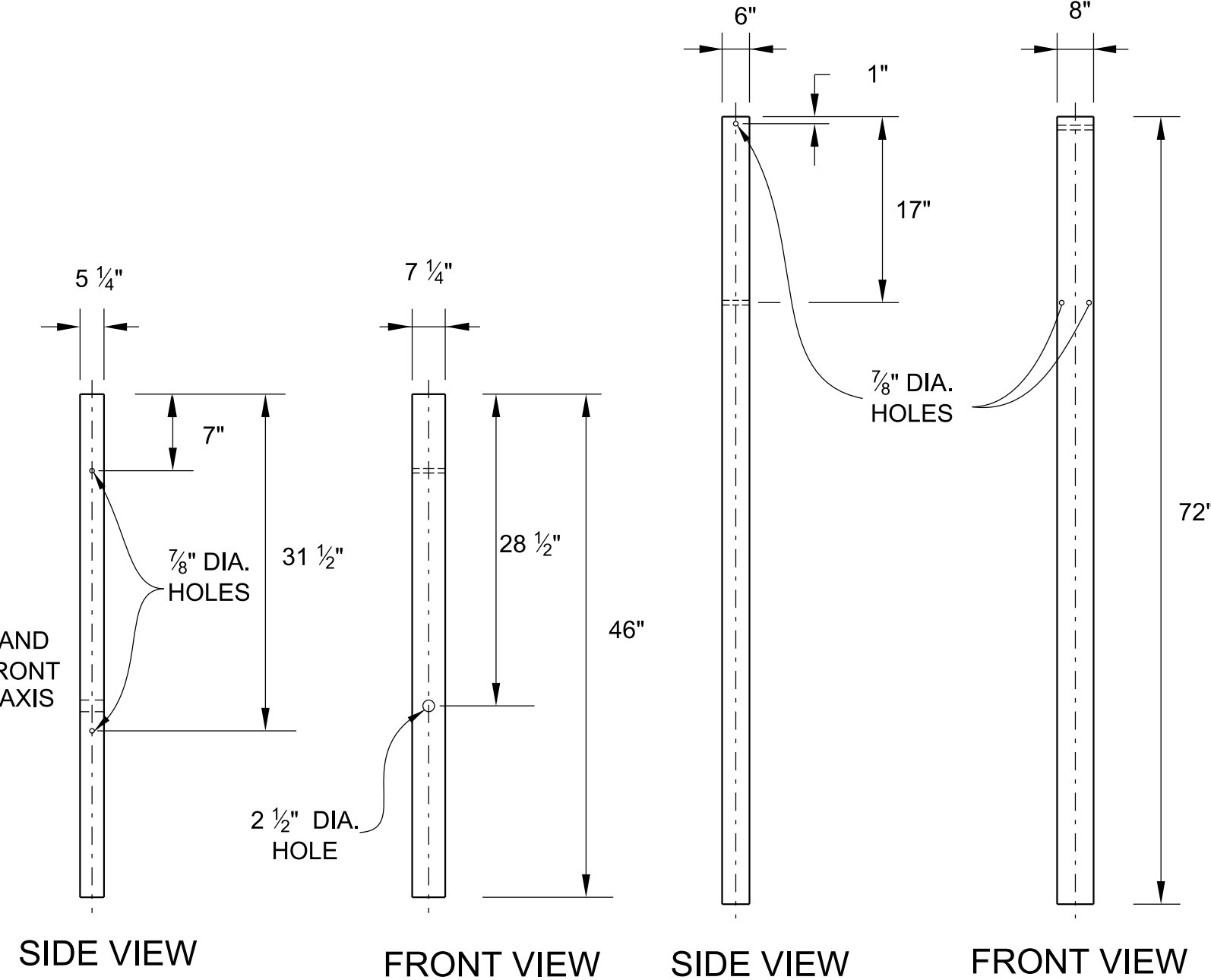
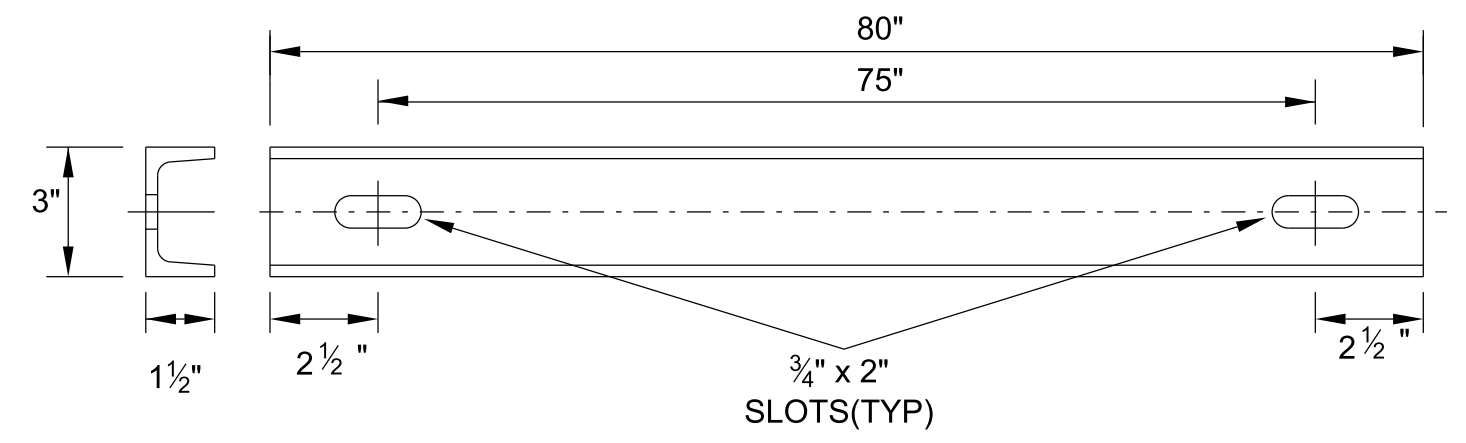
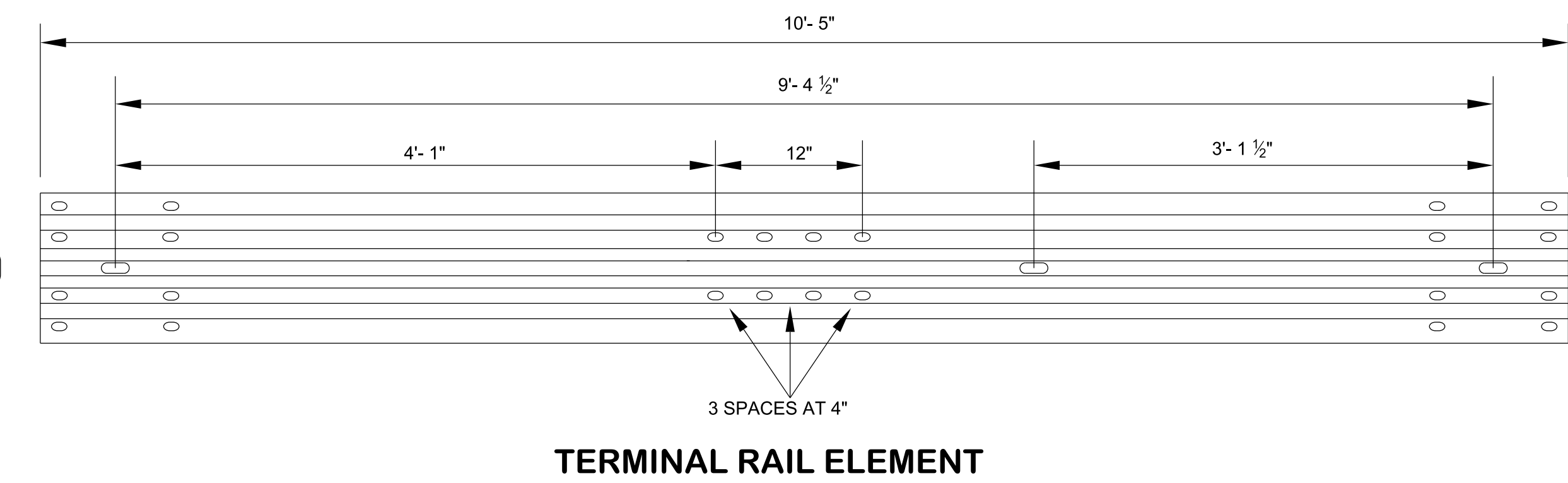
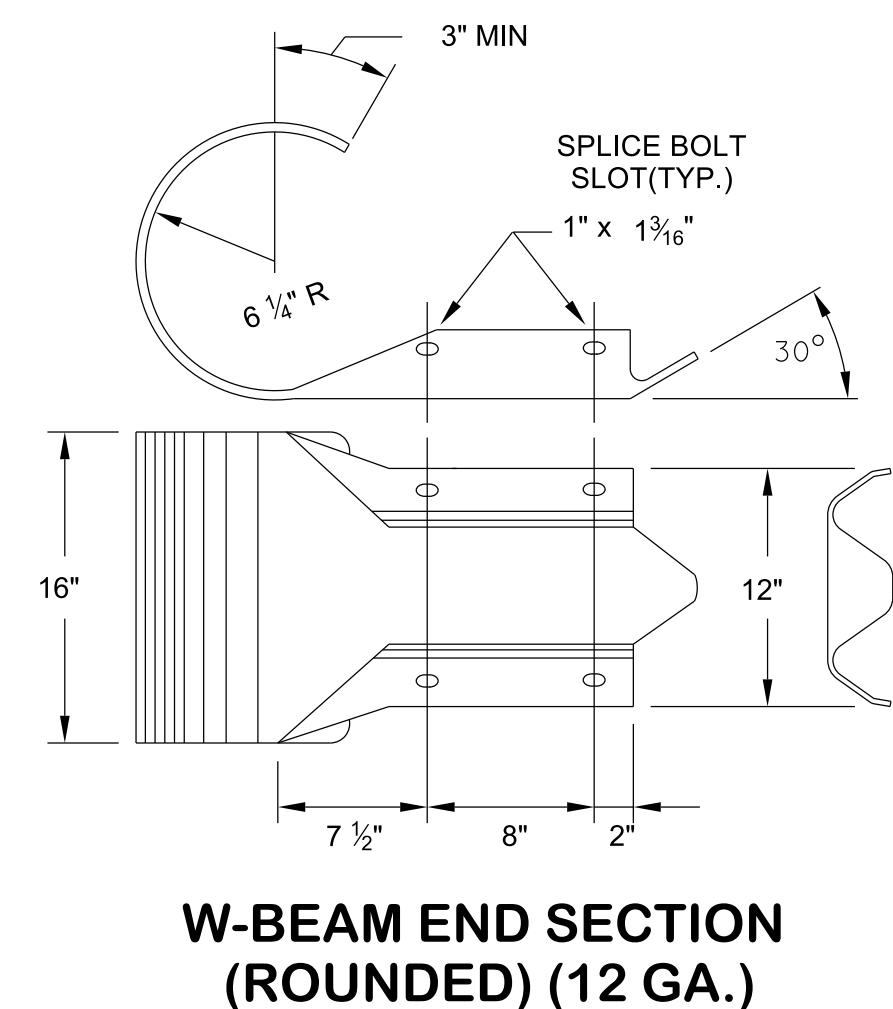
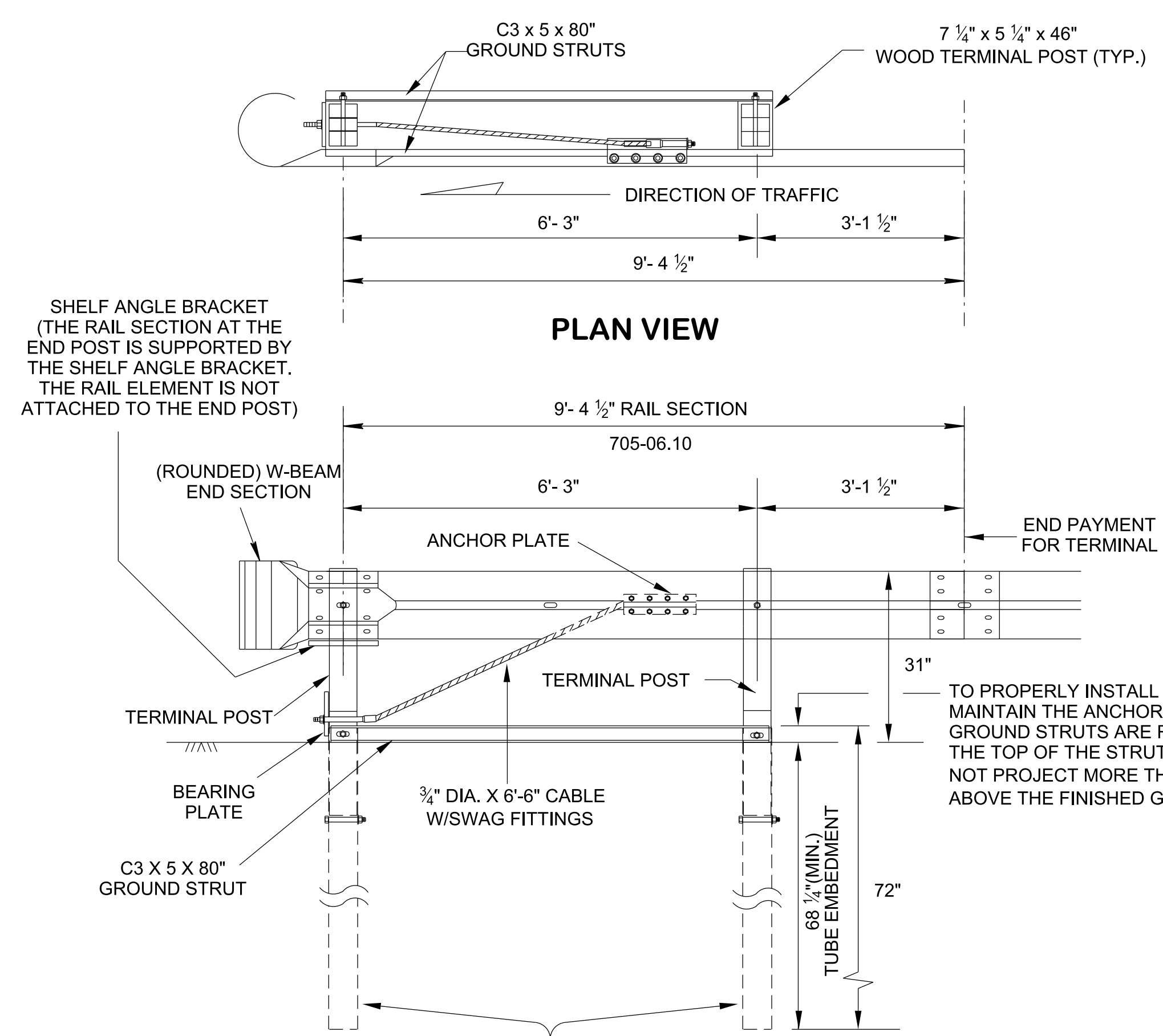
- (1) BOLT HOLES ON THE BACKSIDE ARE FOR DOUBLE FACE GUARDRAIL (IF REQUIRED).
- (2) AN ADDITIONAL 3/4" HOLES ON OTHER SIDE OF THE FLANGE OR BACK FLANGE WILL BE ACCEPTABLE IF THEY ARE LOCATED WITHIN TOP 9" OF THE POST (FOR SINGLE FACE).
- (3) 5/8" DIA. x 9 1/2" LENGTH, BUTTON HEAD BOLT WITH RECESSED NUT OR HEX NUT AND 1 WASHER PER BOLT.
- (4) 2 EXTRA 3/4" HOLES IN POST ABOVE INITIAL HOLE AND 1 EXTRA 3/4" HOLE BELOW FOR VERTICAL ADJUSTMENT.
- (5) ADDITIONAL BOLT HOLES ON THE POST BOTTOM MAY BE ACCEPTABLE FOR MANUFACTURING PURPOSES.

REV. 06-15-2021: REVISED GENERAL NOTES (A) AND (O). REVISED PLASTIC BLOCK-OUT TO COMPOSITE BLOCK-OUT ON SIDE VIEWS.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

GUARDRAIL
GENERAL NOTES
AND
POST DETAILS

7/14/2021 3:08:09 PM P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.08 Guardrail Anchors IPVIGRA3-20210615.d



GENERAL NOTES

(A) TYPE 13 GUARDRAIL ANCHOR SHALL ONLY BE INSTALLED AT TRAILING ENDS WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC. SEE S-CZ-1. THE RE-DIRECTIVE CAPACITY OF THE GUARDRAIL IS ONLY OFFERED AFTER THE THIRD GUARDRAIL POST.

(B) ALL HOLES IN WOOD POSTS ARE TO BE DRILLED BEFORE PRESERVATIVE TREATMENT IS APPLIED.

(C) ALL CUTTING, DRILLING, AND WELDING OF STEEL COMPONENTS SHALL BE DONE BEFORE GALVANIZING.

(D) THE FINISHED CABLE ASSEMBLY WILL NOT BE ACCEPTABLE UNLESS IT IS IN TENSION WITH NO SAG.

(E) OTHER ANCHOR CABLE ASSEMBLIES PROVIDING A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS PER SQUARE INCH WILL BE ACCEPTABLE.

(F) TO BE PAID UNDER ITEM
 705-06.10 GR TERMINAL TRAILING END (TYPE 13) MASH TL3 PER EACH.

(G) ALL HARDWARE SHALL CONFORM TO ASTM A307 UNLESS OTHERWISE SHOWN.

(H) DESIGN BASED ON AASHTO MASH TL-3, TTI REPORT 9-1002-6.

- REV. 5-1-15: REVISED NO. 1 & 2 BREAK WAY POSTS WITH 5'-0" TUBE SLEEVE.
- REV. 5-27-16: REMOVED TYPE 21 AND IN-LINE FROM TITLE, UPDATED POST DETAIL, UPDATED STRUT DETAIL, ADDED RAIL DETAIL, AND UPDATED NOTES.
- REV. 3-28-17: CHANGED PAY ITEM NUMBER.
- REV. 7-5-17: REWORDED NOTE ON STRUT REQUIREMENTS IN THE DOWNSTREAM ANCHOR TERMINAL VIEW.
- REV. 06-28-2019: REDREW SHEET.
- REV. 06-15-2021: REVISED GENERAL NOTE (A).

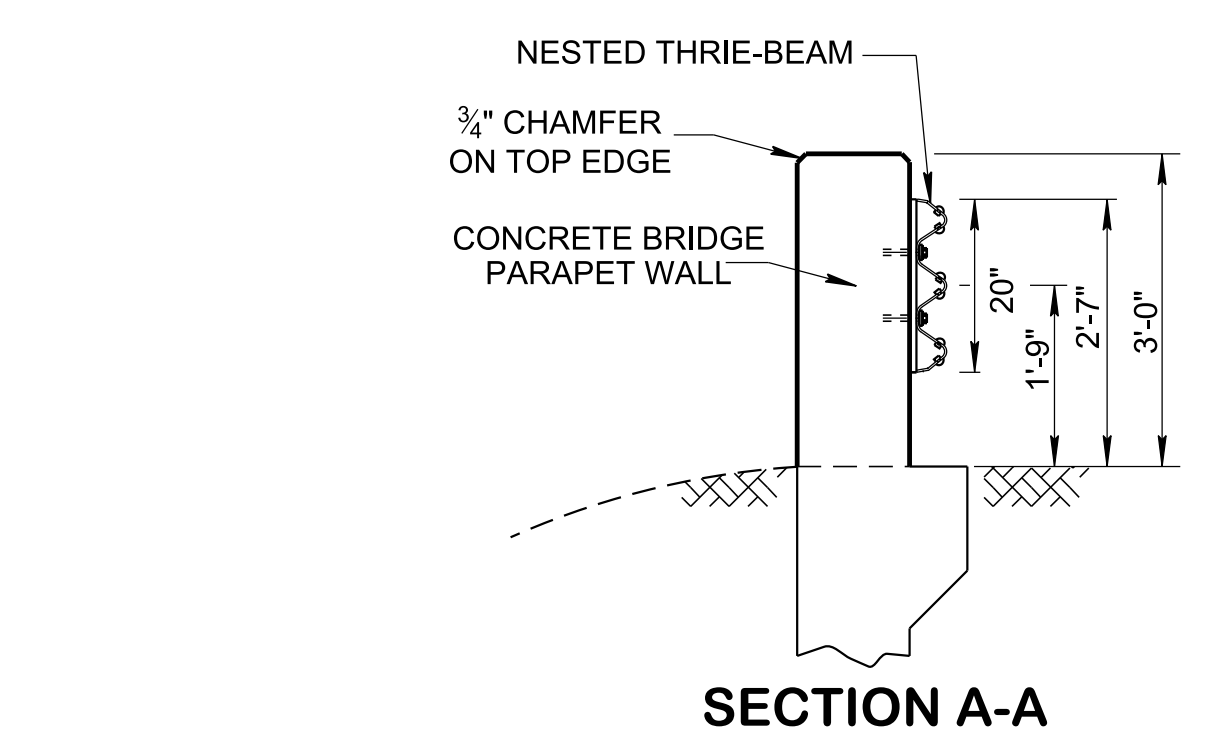
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

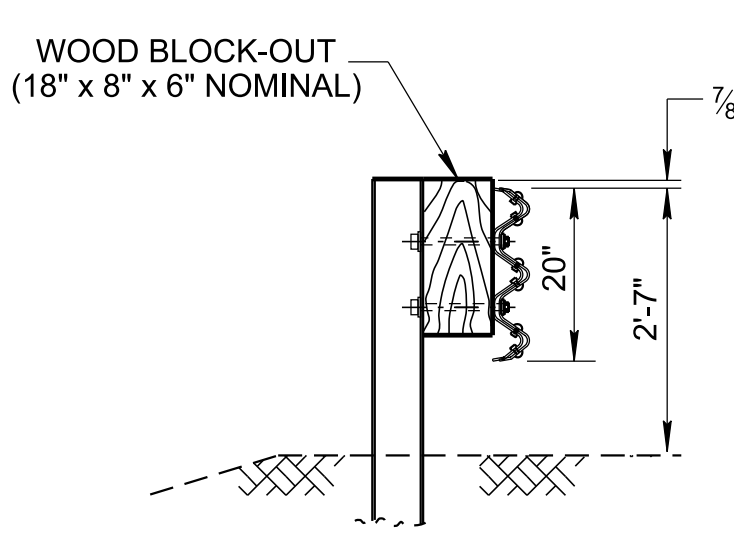
TYPE 13
 GUARDRAIL ANCHOR

7/20/2021 9:34:53 AM P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\ISGRCA-202106

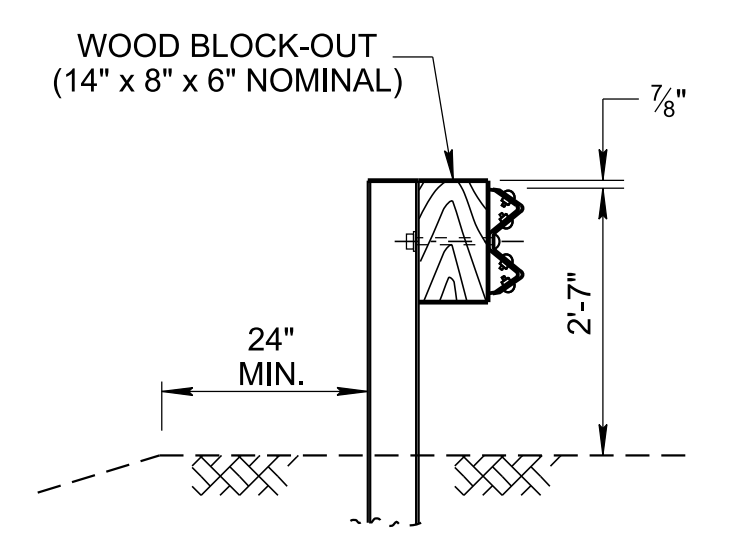
REV. 02-28-20: REVISED GENERAL NOTE (A).
 REV. 10-16-20: RELOCATED SECTION C-C AND ADDED BLOCK-OUT NOTES ON PLAN VIEW. ADDED POST NUMBERS. ADJUSTED THE NUMBER OF POSTS ON ELEVATION VIEW. REVISED GENERAL NOTES (D), (F) AND (G).
 REV. 06-15-21: REVISED PLAN AND ELEVATION VIEWS AND GENERAL NOTE (D). REVISED LEGEND NOTE 2.



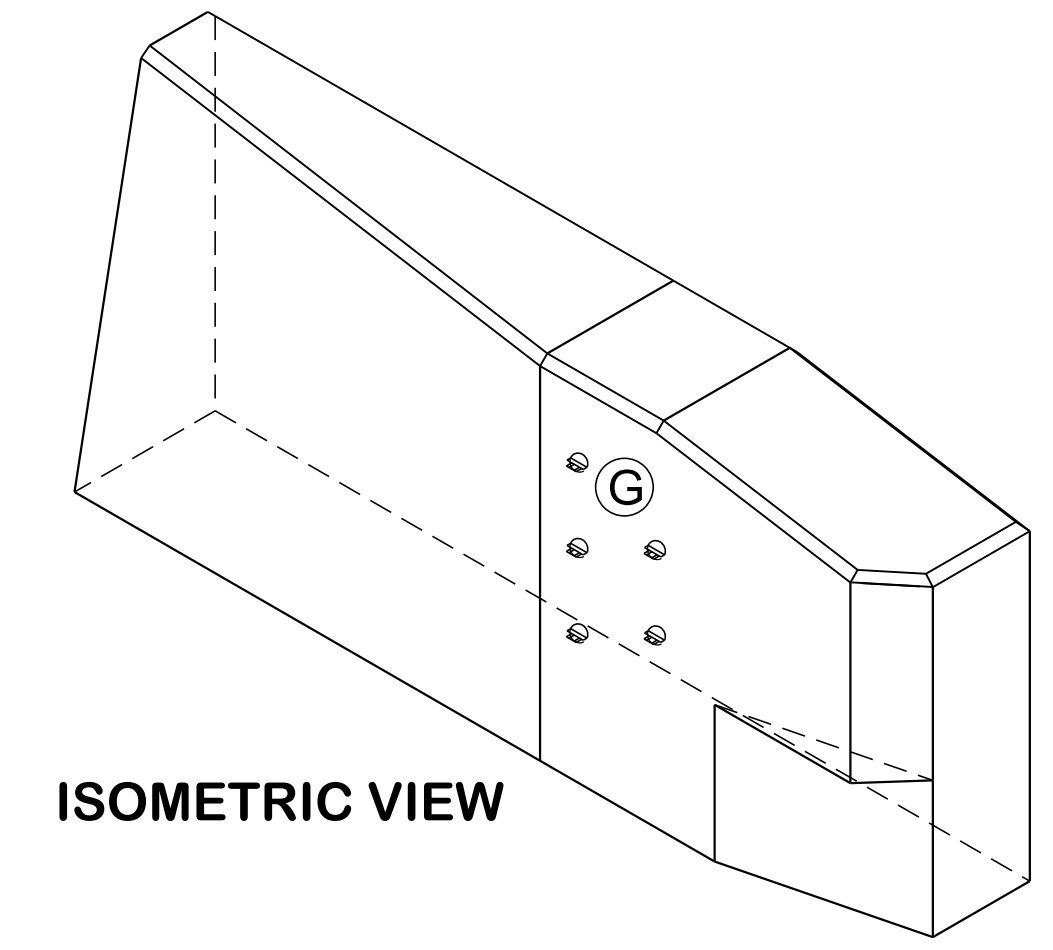
- LEGEND**
- (1) 1 1/8" POST OFFSET TO BOLT HOLE (TYPICAL)
 - (2) FOR THE TRAILING SIDE OF THE ROADWAY, DUE TO POST BEING REVERSED, BOLT HOLE WILL OFFSET 2 1/4".



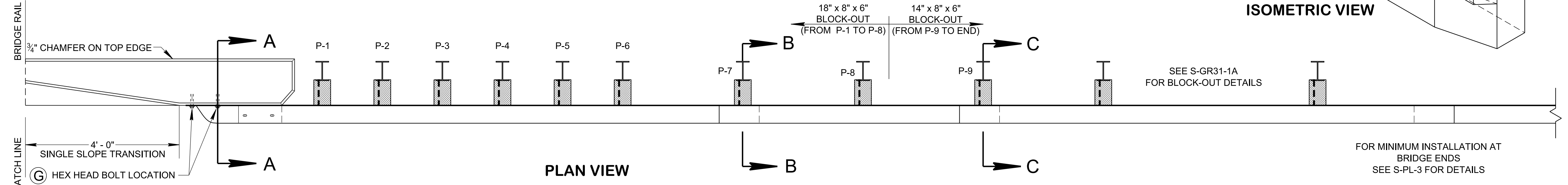
SECTION B-B



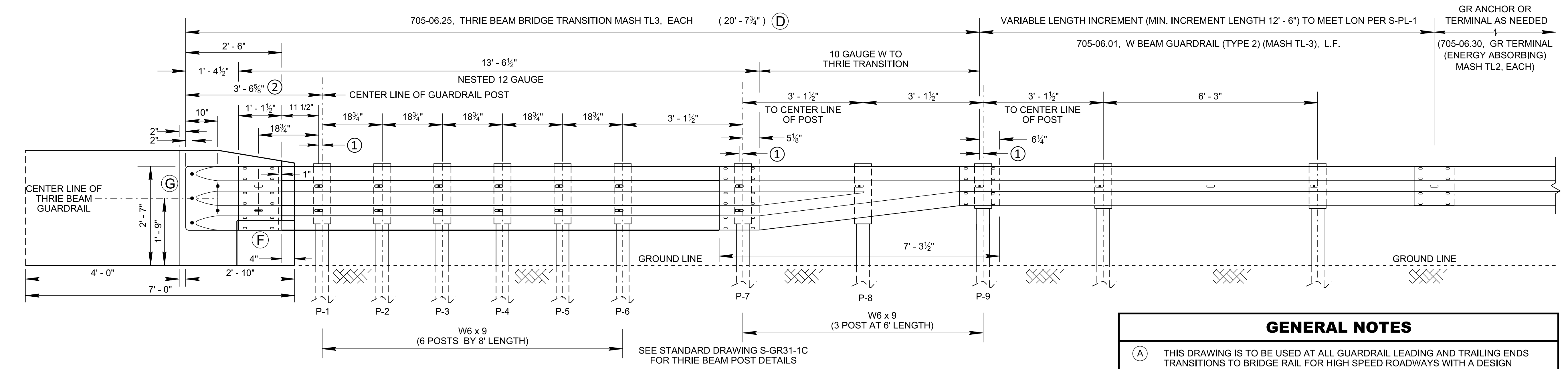
SECTION C-C



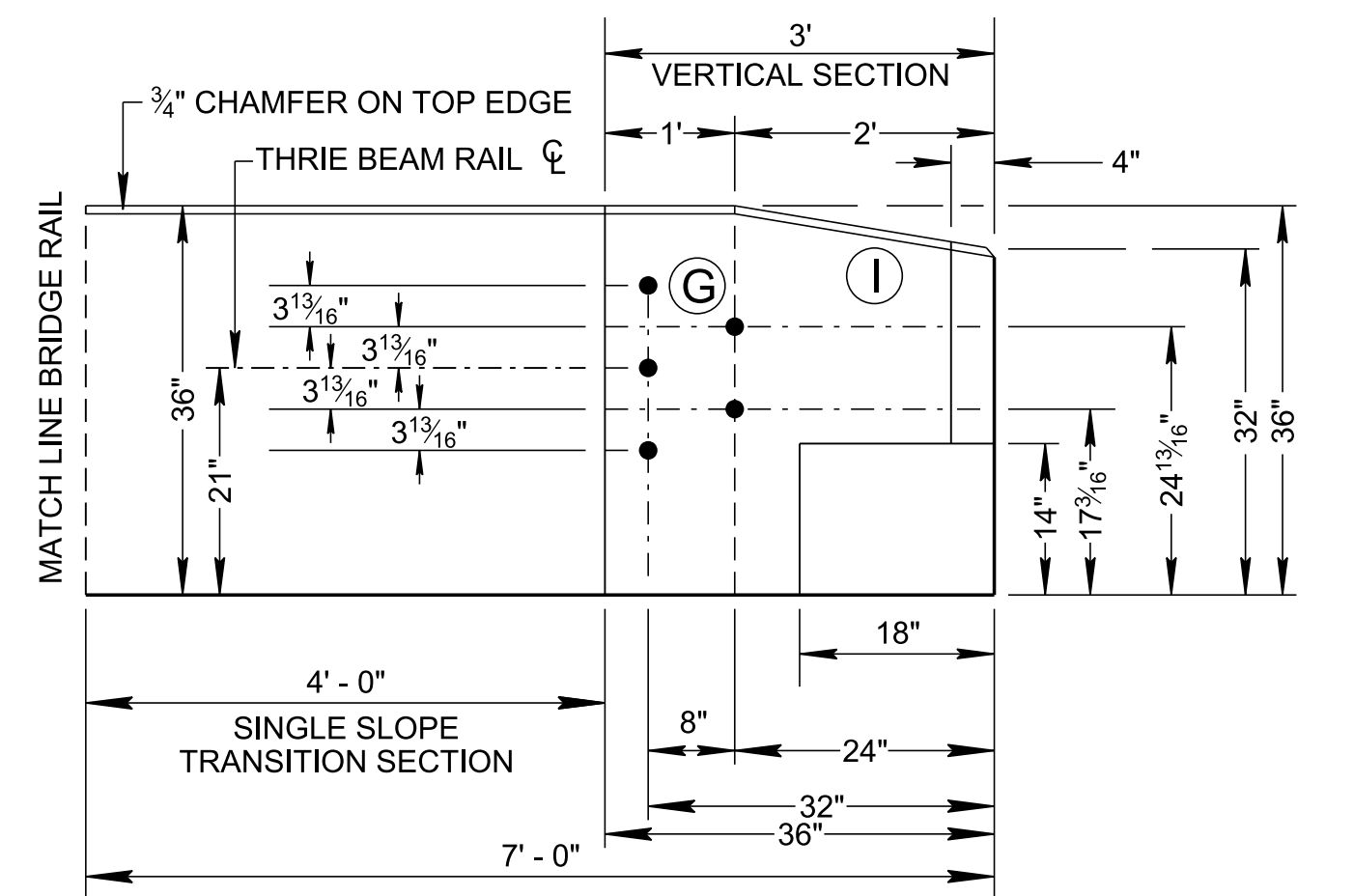
ISOMETRIC VIEW



PLAN VIEW

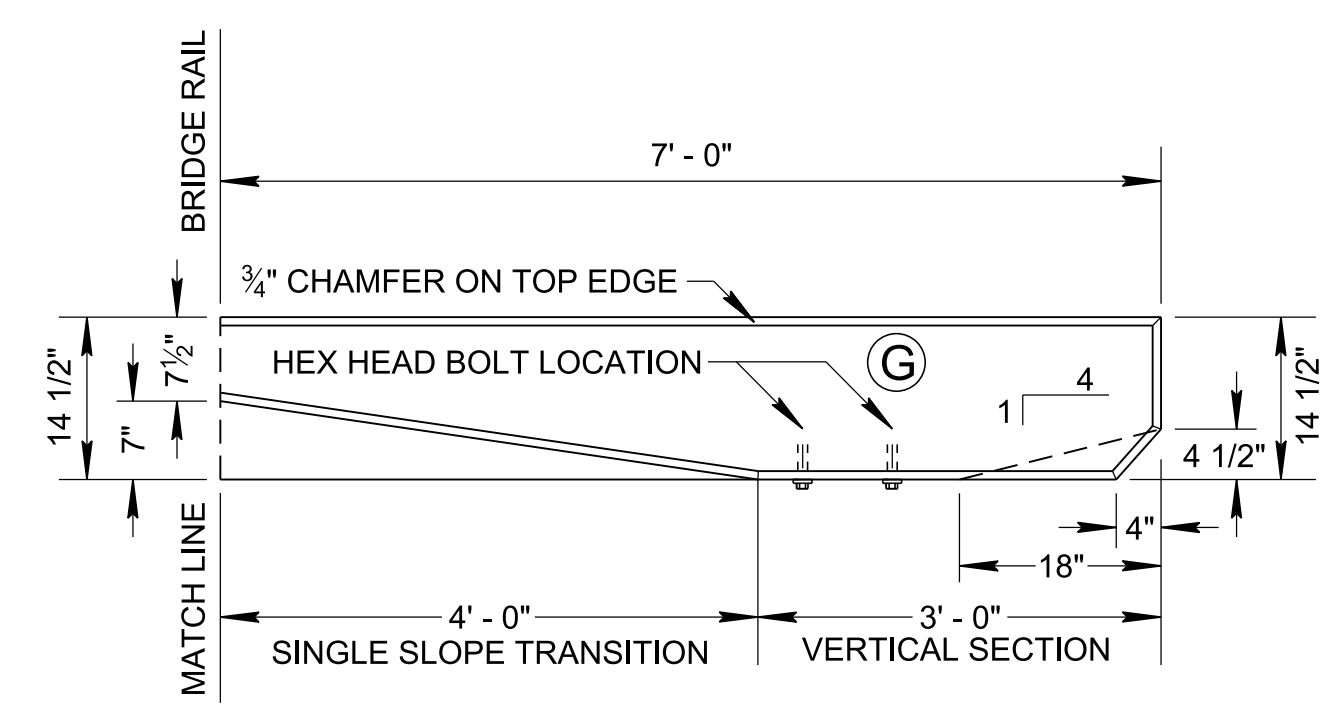


ELEVATION VIEW

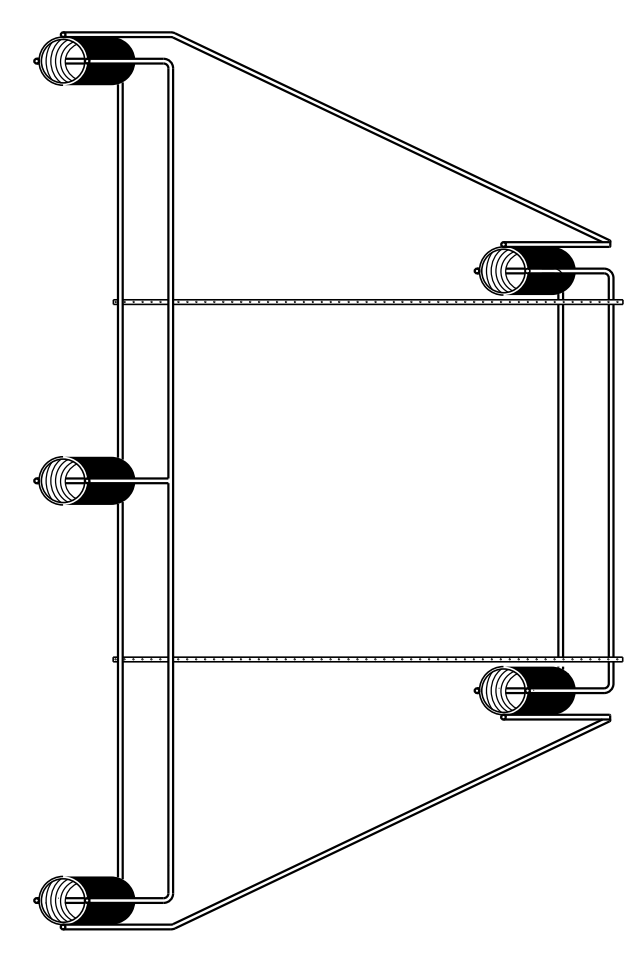


WALL ELEVATION VIEW

CONCRETE BRIDGE PARAPET WALL DETAILS



PLAN VIEW



INSERT ASSEMBLY

CAST IN PLACE THREADED STEEL INSERT WITH 7/8" x 2" HEX HEAD GALVANIZED BOLTS (A307) HOT DIP ZINC COATING ASTM A153

GENERAL NOTES

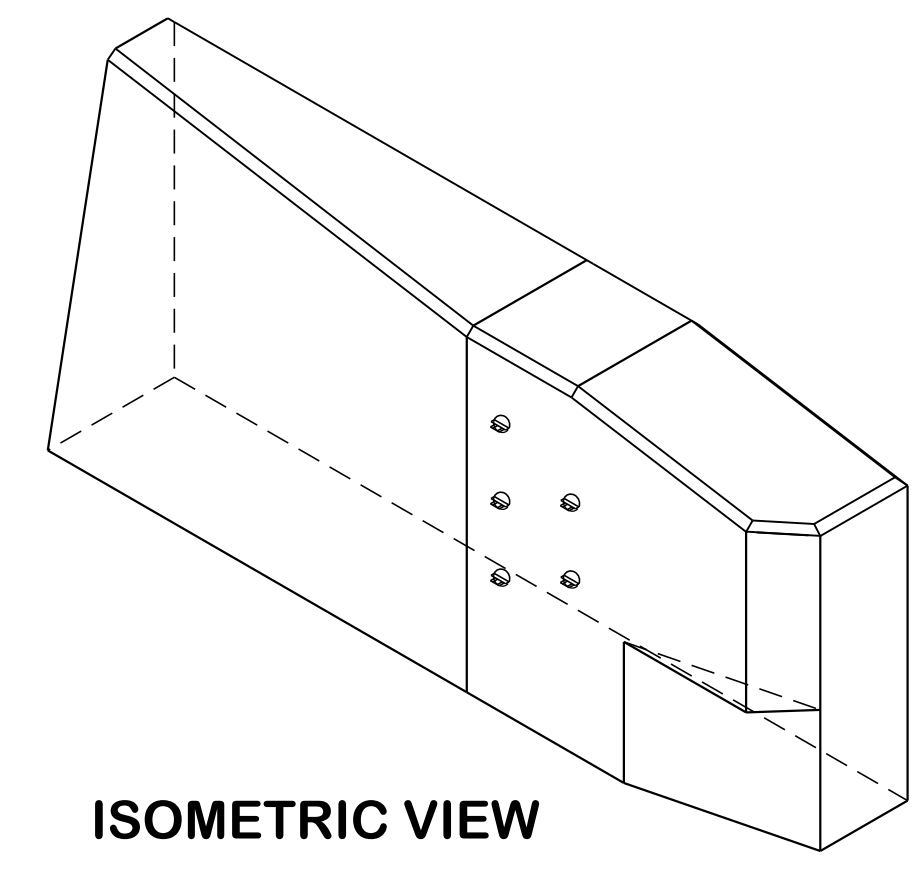
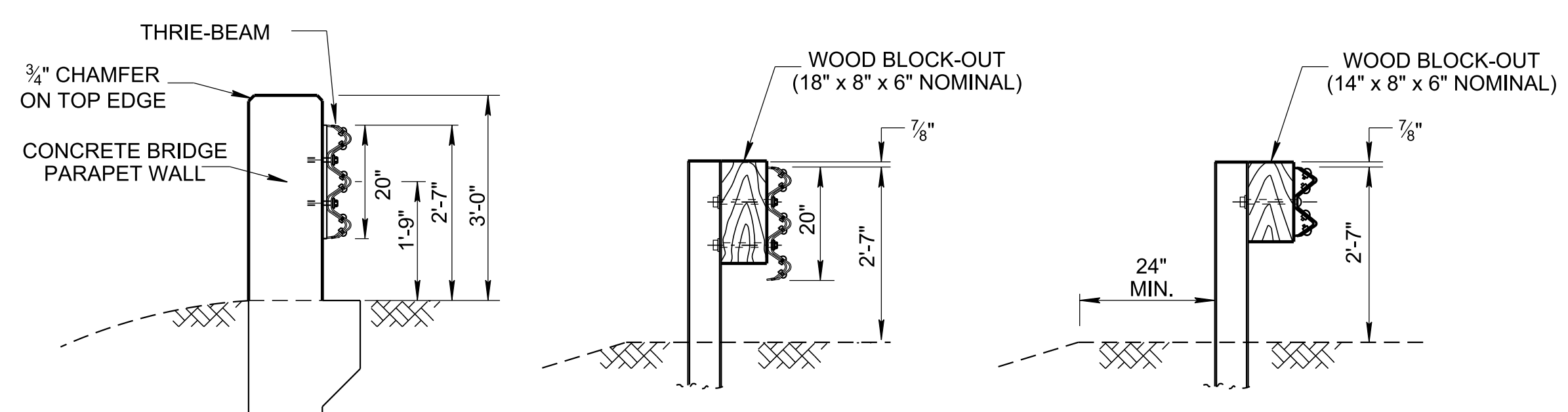
- (A) THIS DRAWING IS TO BE USED AT ALL GUARDRAIL LEADING AND TRAILING ENDS TRANSITIONS TO BRIDGE RAIL FOR HIGH SPEED ROADWAYS WITH A DESIGN SPEED OF > 45 M.P.H. (IF DETERMINED TO BE WITHIN THE CLEAR ZONE).
- (B) CONNECTION TO BRIDGE RAIL SHOWN; FOR CONNECTION TO CONCRETE MEDIAN BARRIER WALLS, SEE STANDARD DRAWING S-SSMB-6F.
- (C) SEE STANDARD DRAWINGS STD-1 SERIES FOR BRIDGE RAILING DETAILS. S-GR31-1 SERIES FOR ALL OTHER GUARDRAIL DETAILS AND MATERIAL PROPERTIES NOT SHOWN AND S-PL-3 FOR MINIMUM LENGTH AND DELINEATOR REQUIREMENTS.
- (D) INSTALLATION OF GUARDRAIL CONNECTOR TO THE BRIDGE RAIL SHALL BE INCLUDED UNDER ITEM 705-06.25, THRIE BEAM BRIDGE TRANSITION MASH TL-3, PER EACH. COMPONENTS INCLUDE BUT NOT LIMITED TO, THRIE BEAM TERMINAL CONNECTION, THRIE BEAM RAIL, THRIE BEAM TRANSITION PANEL, ALL COMPONENTS REQUIRED FOR ATTACHMENT OF THE THRIE BEAM RAILS TO THE BRIDGE RAIL AND POSTS.
- (E) BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND WASHER AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPlice" BOLTS (ASTM 307), 5/8" DIA. X 2" (AT THRIE-BEAM RAIL SPLICES) WITH 5/8" DOUBLE RECESSED NUTS.
- (F) GALVANIZED WASHERS USED WITH THE 5/8" DIA. POST BOLTS SHALL BE TYPE A 1-3/4" O. D. WASHERS.
- (G) USE INSERT ASSEMBLY TO CONNECT THE THRIE BEAM GUARDRAIL TO THE BRIDGE RAIL USING 5 HEX HEAD BOLTS AT 7/8" Ø X 2" AND WASHERS.
- (H) SAFETY PERFORMANCE OF THIS DEVICE HAS BEEN EVALUATED PER TRB 2672(39) 41-51 DEVELOPMENT OF A STANDARDIZED BUTTRESS FOR APPROACH GUARDRAIL TRANSITIONS AND TTI REPORT 9-1002-12-3, FOR MASH TL-3.
- (I) TRANSITION TO 36" MAY BE ELIMINATED WHEN 32" PARAPET WALL DESIGN IS USED.

APPROVED BY FHWA (ALL OTHERS APPROVED BY TDOT)

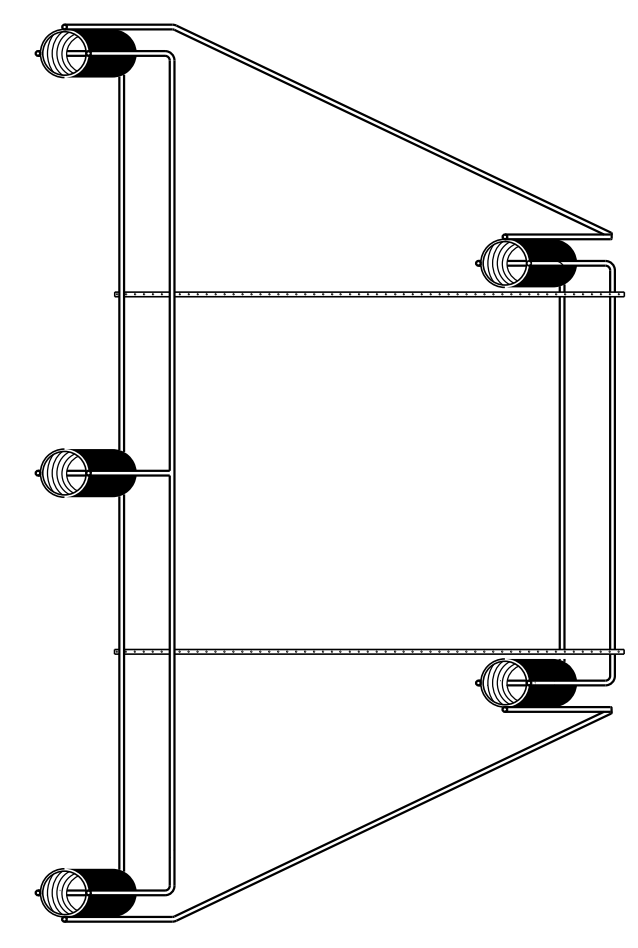
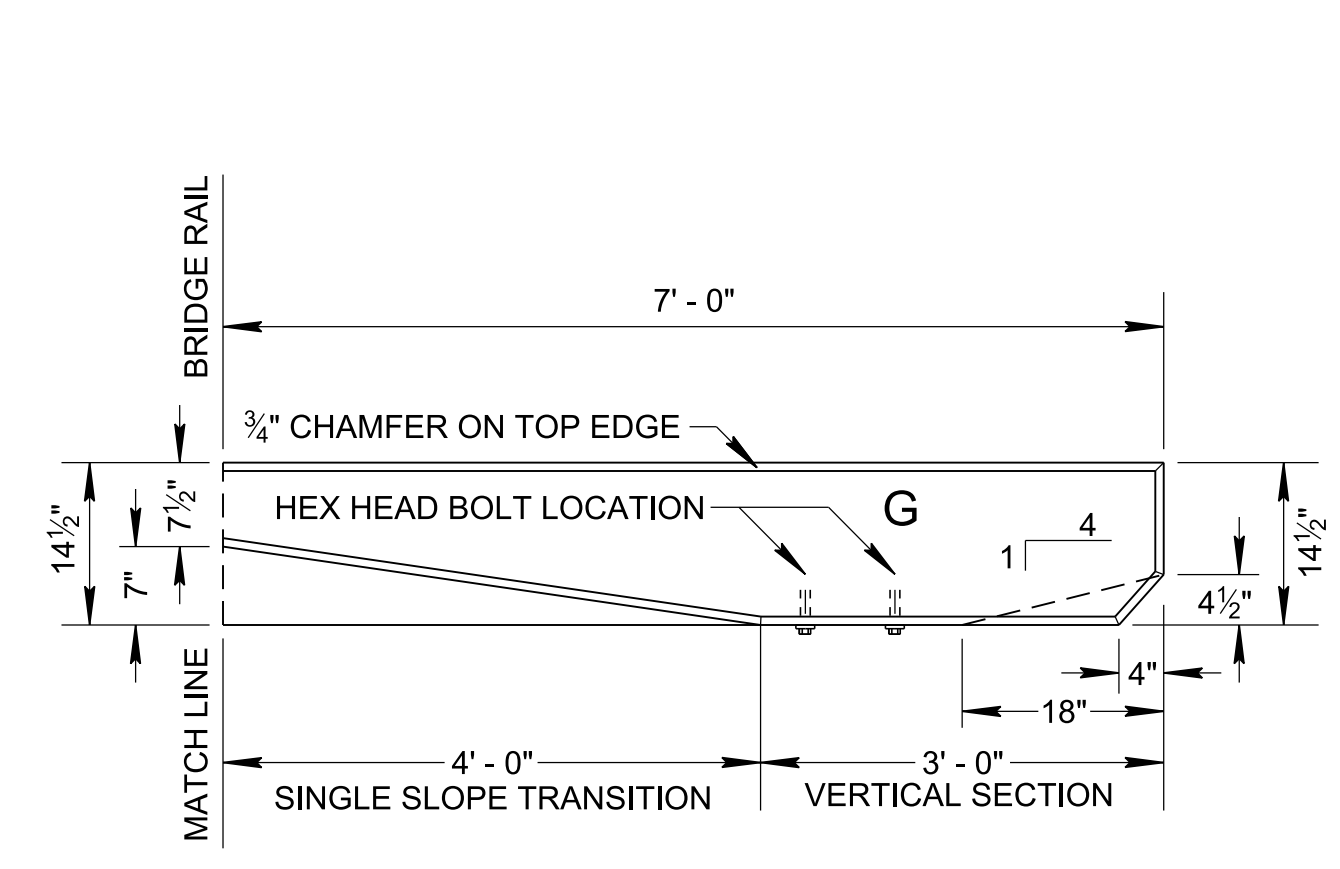
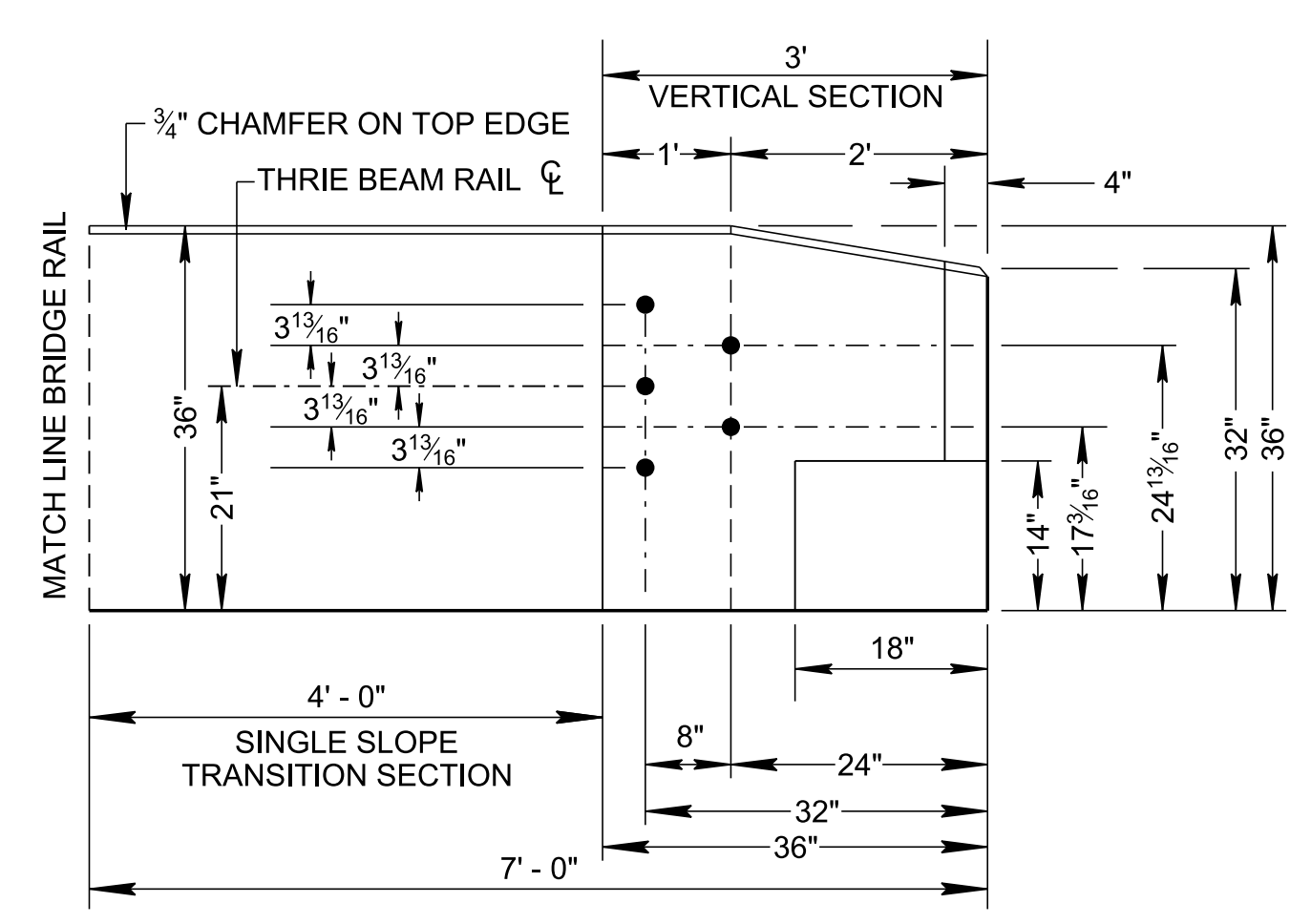
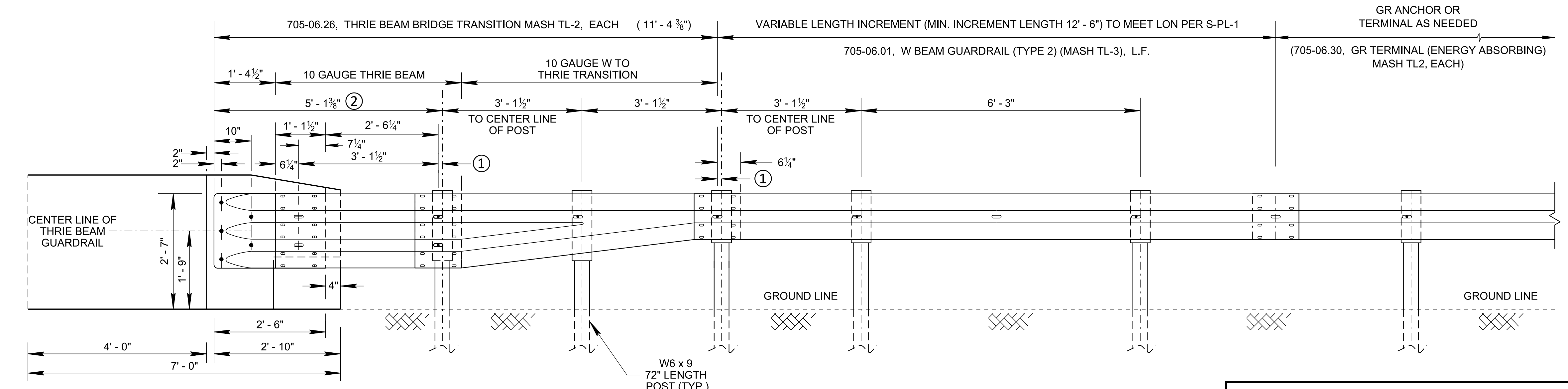
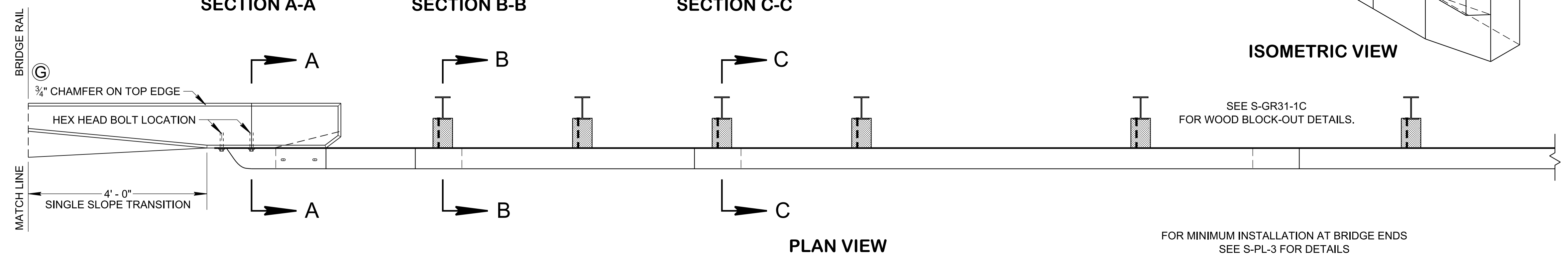
STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

GUARDRAIL CONNECTION TO BRIDGE RAILING CONCRETE PARAPET

7/20/2021 9:36:32 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.05 Guardrail Connections IPYISGR6-202106



- LEGEND**
- ① 1/8" POST OFFSET TO BOLT HOLE (TYPICAL)
 - ② FOR THE TRAILING SIDE OF THE ROADWAY, DUE TO POST BEING REVERSED, BOLT HOLE WILL OFFSET 2 1/4".



- GENERAL NOTES**
- (A) THIS DRAWING IS TO BE USED AT ALL GUARDRAIL LEADING AND TRAILING TRANSITIONS TO BRIDGE RAIL FOR LOWER SPEED ROADWAYS WITH DESIGN SPEED 45 M.P.H. OR LESS (IF DETERMINED TO BE WITHIN THE CLEAR ZONE).
 - (B) CONNECTION TO BRIDGE RAIL SHOWN; FOR CONNECTION TO CONCRETE MEDIAN BARRIER WALLS, SEE S-SSMB-6.
 - (C) SEE STANDARD DRAWINGS STD-1 SERIES FOR BRIDGE RAILING DETAILS. S-GR31-1 SERIES FOR ALL OTHER GUARDRAIL DETAILS AND MATERIAL PROPERTIES NOT SHOWN AND S-PL-3 FOR MINIMUM LENGTH AND DELINEATOR REQUIREMENTS.
 - (D) INSTALLATION OF GUARDRAIL CONNECTOR TO THE BRIDGE RAIL SHALL BE INCLUDED UNDER ITEM 705-06.26, THRIE BEAM BRIDGE TRANSITION MASH TL-2, PER EACH. COMPONENTS INCLUDE BUT NOT LIMITED TO, THRIE BEAM TERMINAL CONNECTION, THRIE BEAM RAIL, THRIE BEAM TRANSITION PANEL, ALL COMPONENTS REQUIRED FOR ATTACHMENT OF THE THRIE BEAM RAILS TO THE BRIDGE RAIL AND POSTS.
 - (E) BUTTON HEAD "POST" BOLTS (ASTM A307) SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT (ASTM A563) AND WASHER AND NOT MORE THAN 1" BEYOND IT. BUTTON HEAD "SPLICE" BOLTS (ASTM 307) 5/8" DIA. X 2" (AT TRIPLE RAIL SPLICES) WITH 5/8" DOUBLE RECESSED NUTS.
 - (F) GALVANIZED WASHERS USED WITH THE 5/8" DIA. POST BOLTS SHALL BE TYPE A 1-3/4" O. D. WASHERS.
 - (G) USE INSERT ASSEMBLY TO CONNECT THE THRIE BEAM GUARDRAIL TO THE BRIDGE RAIL USING 5 HEX HEAD BOLTS AT 7/8" Ø X 2" AND WASHERS.
 - (H) SAFETY PERFORMANCE OF THIS DEVICE HAS BEEN EVALUATED PER TRB 2672(39) 41-51 DEVELOPMENT OF A STANDARDIZED BUTTRESS FOR APPROACH GUARDRAIL TRANSITIONS AND TTI REPORT 9-1002-8, FOR MASH TL-2.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

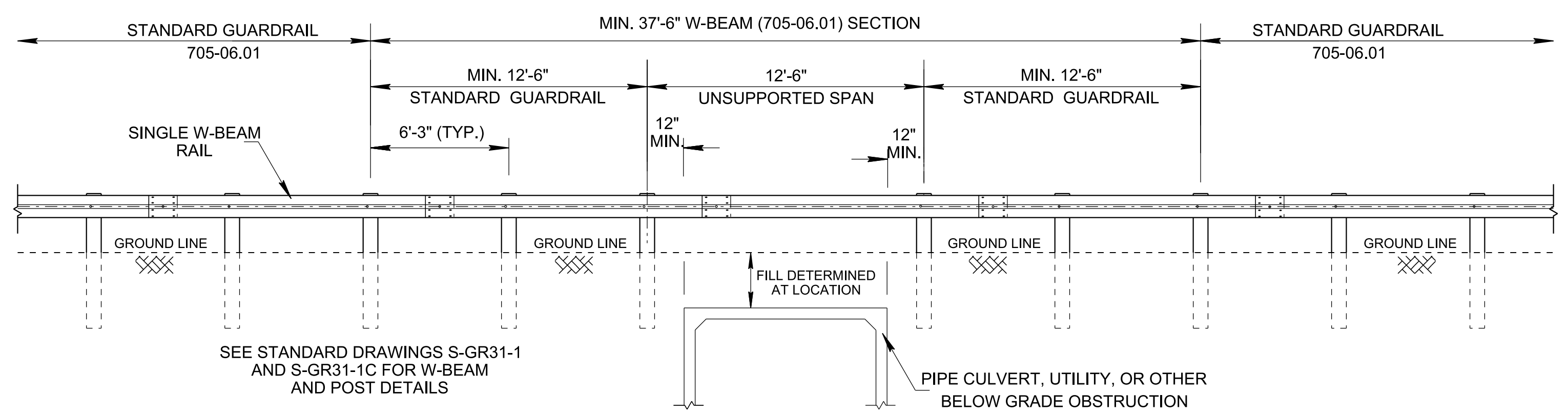
GUARDRAIL CONNECTION TO BRIDGE ENDS FOR LOW SPEED ROADWAYS

06-28-2019 S-GRC-6

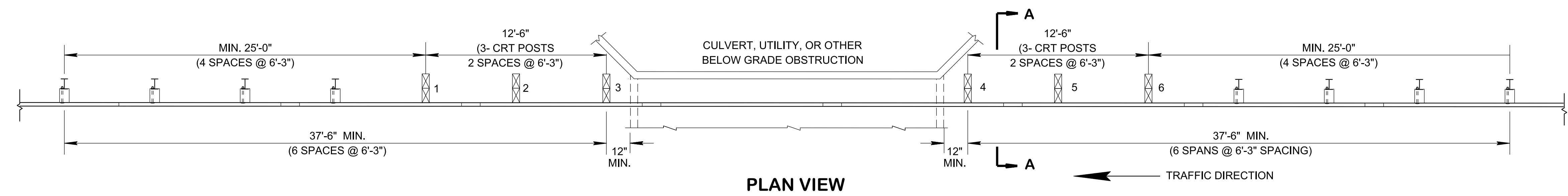
REV. 02-28-20: REVISED GENERAL NOTE (A).
REV. 10-16-20: RELOCATED SECTION C-C AND ADDED BLOCK-OUT NOTES ON PLAN VIEW. ADDED POST NUMBERS. ADJUSTED THE NUMBER OF POSTS ON ELEVATION VIEW. REVISED GENERAL NOTES (D), (F) AND (G).
REV. 06-15-21: REVISED PLAN AND ELEVATION VIEWS AND GENERAL NOTE (D). REVISED LEGEND NOTE 2.

NOT TO SCALE

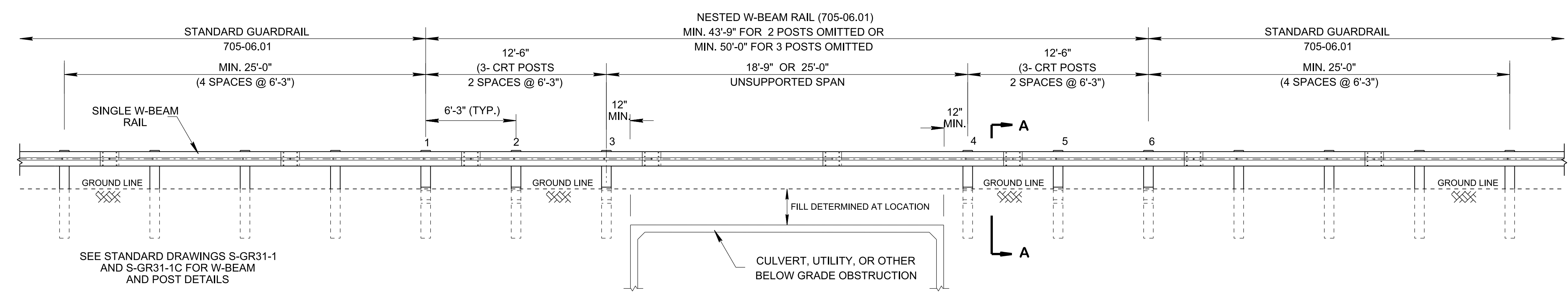
7/16/2021 2:02:51 PM P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.06 Guardrail (Special Cases) IP\SGRS-1-202



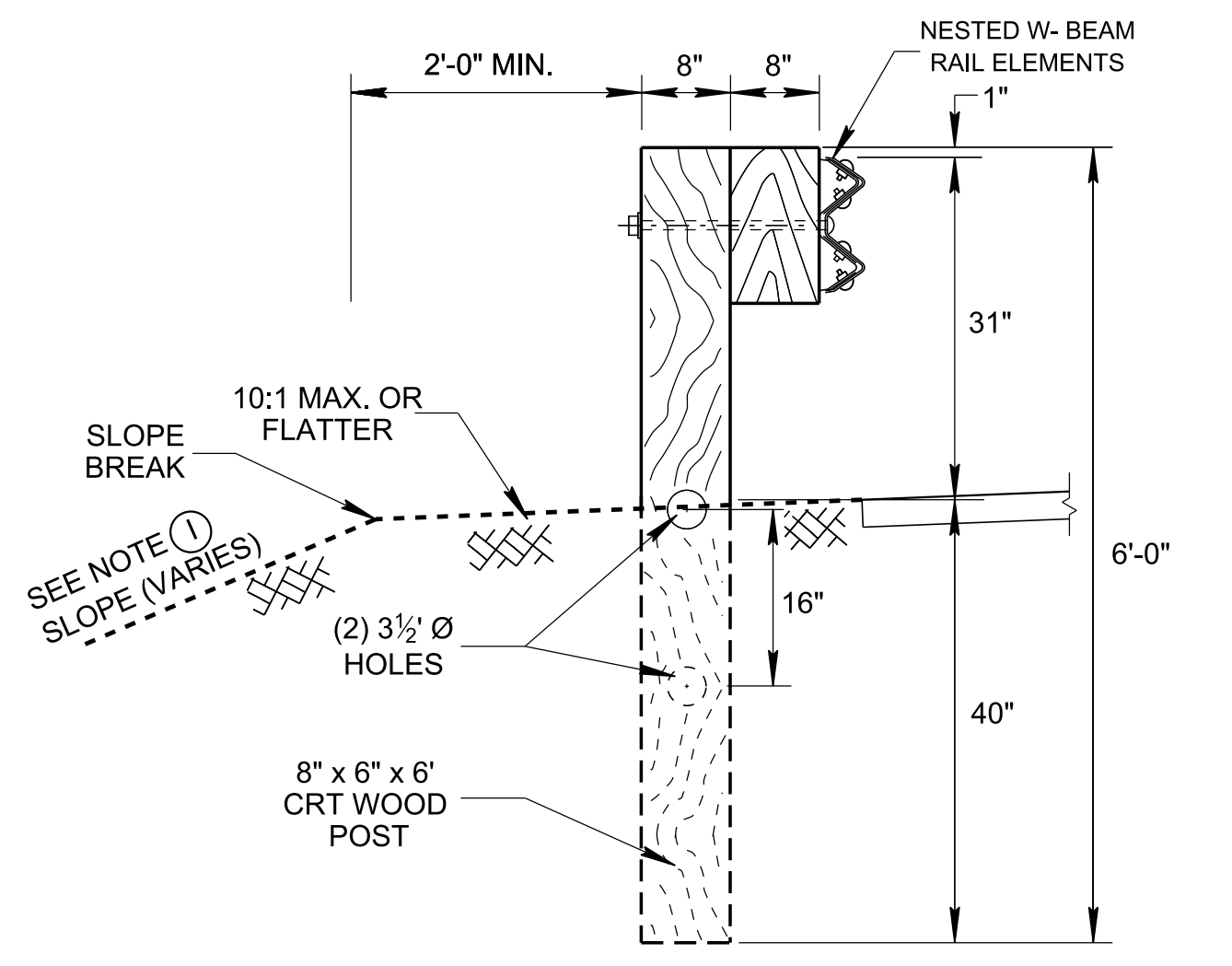
ELEVATION VIEW
W-BEAM RAIL AT 1 OMITTED POST



PLAN VIEW



ELEVATION VIEW
NESTED W-BEAM RAIL AT 2 OR 3 OMITTED POSTS



SECTION A-A
TYPICAL SECTION AT CRT POST (1 THRU 6)

GENERAL NOTES	
<p>(A) DRAWING IS TO BE USED FOR GUARDRAIL PLACEMENT WHEN ENCOUNTERING AN OBSTRUCTION WHICH WILL PREVENT GUARDRAIL POSTS TO BE INSTALLED PROPERLY.</p> <p>(B) POSTS MAY BE OMITTED ON A RUN OF GUARDRAIL ONLY. THIS APPLICATION IS NOT TO BE USED AS PART OF AN END TERMINAL. IF AN OBSTRUCTION IS ENCOUNTERED AT A TERMINAL LOCATION, THE GUARDRAIL RUN IS TO BE EXTENDED TO A POINT WHERE THE TERMINAL MAY BE INSTALLED PROPERLY.</p> <p>(C) ONLY ONE, TWO OR THREE POSTS MAY BE OMITTED AT AN OBSTRUCTION.</p> <p>(D) WHEN MORE THAN ONE OBSTRUCTION IS ENCOUNTERED ON A RUN OF GUARDRAIL, THREE CONSECUTIVE CRT POSTS ADJACENT TO EACH END OF THE UNSUPPORTED SPAN SHALL BE INSTALLED.</p> <p>(E) SEE STANDARD DRAWINGS RD11-TS-SERIES FOR SLOPE CRITERIA, S-GRT31 SERIES FOR GUARDRAIL DETAILS AND S-PL-6 FOR GUARDRAIL PLACEMENT DETAILS.</p> <p>(F) IF ANY OF THE CONDITIONS NOTED IN GENERAL NOTES A, C, OR D CANNOT BE MET, THAN USE THE GUARDRAIL WITH FOOTING OPTION AS SHOWN ON STANDARD DRAWINGS S-GRS-3 OR S-GRS-5 SERIES.</p>	<p>(G) THE NESTED SECTION WILL BE BUILT AS SHOWN BUT PAYMENT WILL BE MEASURED FOR A LENGTH OF 3 POSTS ON EITHER SIDE OF THE OMITTED POST.</p> <p>(H) MIDWEST GUARDRAIL SYSTEM (MGS) LONG SPAN SYSTEM HAS BEEN EVALUATED BY THE MIDWEST ROADSIDE SAFETY FACILITY AND MEET MASH TL-3 STANDARDS. THE EVALUATION HAS BEEN DOCUMENTED IN MIDWEST STATES POOLED FUND PROGRAM RESEARCH REPORT NUMBER TRP-03-326-16.</p> <p>(I) THE MINIMUM LENGTH OF TANGENT MGS W-BEAM GUARDRAIL WHICH SHALL BE INSTALLED FROM THE OUTERMOST CRT POST IS: 25'-0" TO THE BEGINNING OF ANY FLARED GUARDRAIL SECTION, 50'-0" FROM END GUARDRAIL ANCHORAGE/TERMINAL, 28'-1 1/2" FROM W-BEAM TO THRIE BEAM TRANSITION AND 37'-6" BETWEEN UNSUPPORTED SPAN (OMITTED POSTS) THESE ITEMS ARE PAID FOR SEPARATE FROM THE MGS LONG SPAN GUARDRAIL.</p> <p>(J) PAYMENT FOR FURNISHING AND INSTALLING LONG SPAN GUARDRAIL INCLUDING ALL MATERIAL AND LABOR FOR CONSTRUCTION WILL BE MADE UNDER PAY ITEM NUMBER: 705-06.01, W-BEAM GUARDRAIL (TYPE 2) MASH TL-3 PER L.F.</p>

- REV. 1-29-16: CORRECTED PAY ITEM NUMBER.
- REV. 3-28-17: CLARIFIED "RD01-SERIES" TO "RD01-TS-SERIES IN GENERAL NOTE (E). ADDED NOTE (H). CHANGED ITEM NUMBER IN ELEVATION VIEW.
- REV. 06-28-19: REVISED GENERAL NOTE (E) TO RD11-TS-SERIES. REDREW SHEET.
- REV. 06-15-21: REVISED THE DESCRIPTION OF THE STANDARD DRAWING, ONE OMITTED POST DRAWING AND THE SECTION. ADDED DRAWINGS FOR 2 OR 3 OMITTED POSTS. REVISED GENERAL NOTES (C), (D), (E), (F) AND (H). ADDED GENERAL NOTES (I) AND (J).

■ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

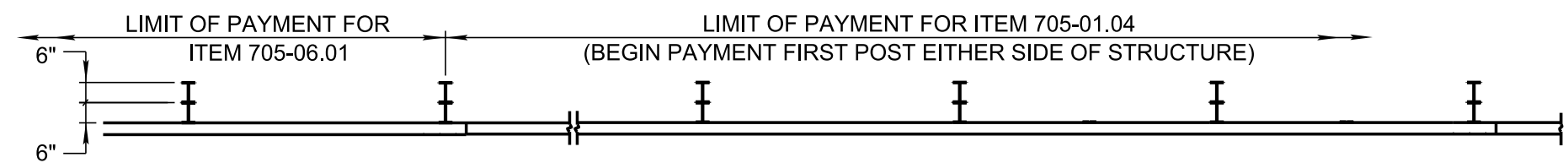
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SPECIAL CASE
LONG SPAN
GUARDRAIL
1 POST, 2 OR 3 POSTS
OMITTED

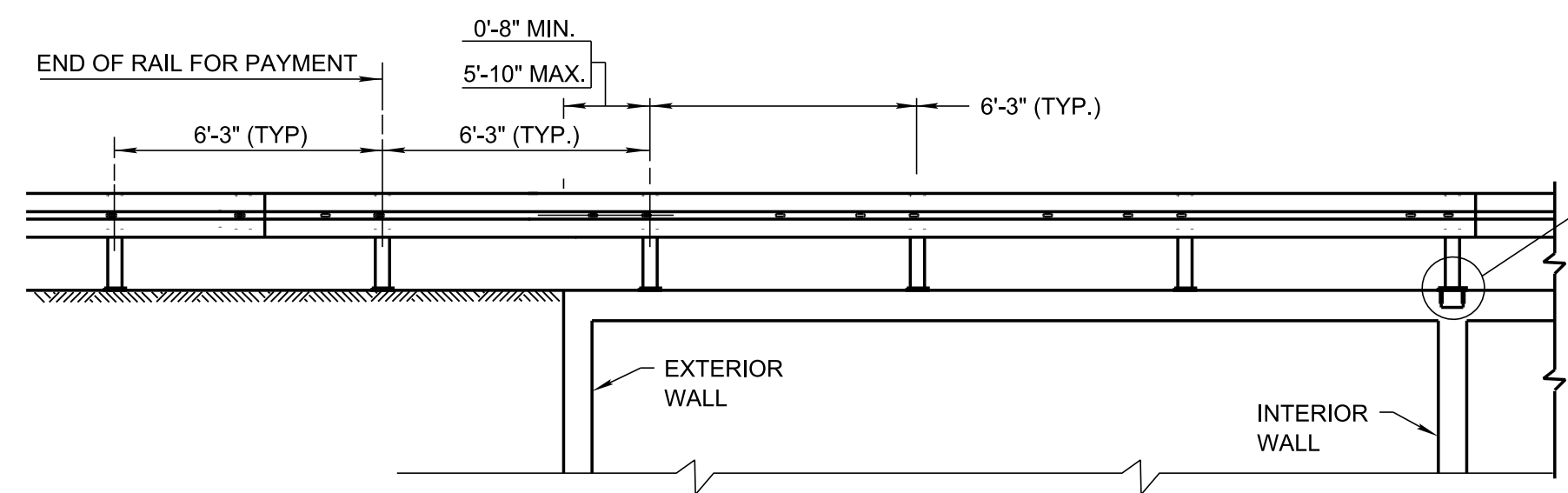
07-11-2013 S-GRS-1

NOT TO SCALE

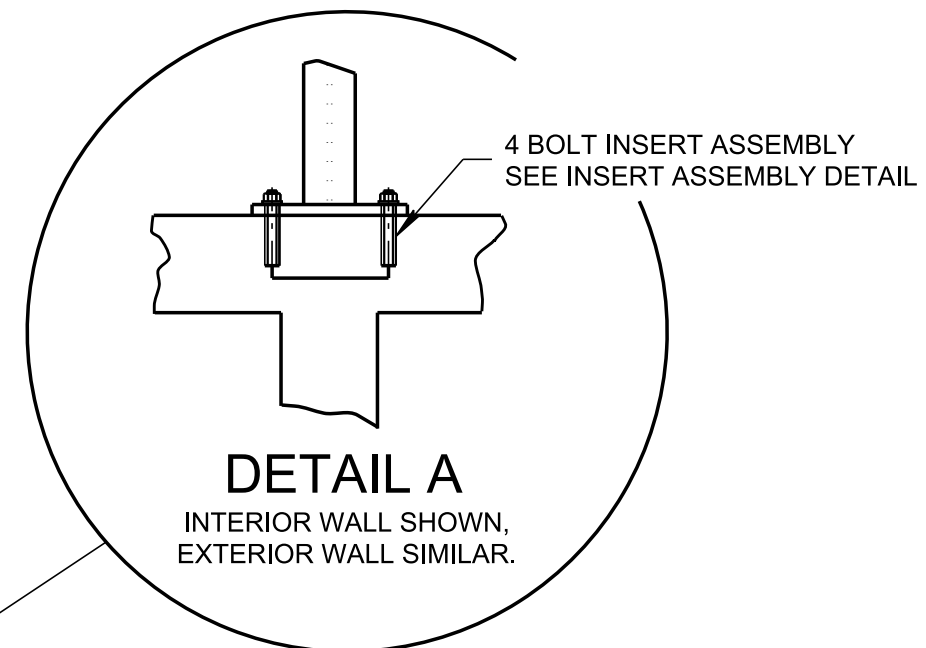
7/20/2021 10:11:37 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP106.06 Guardrail (Special Cases) IPISGRS2-202



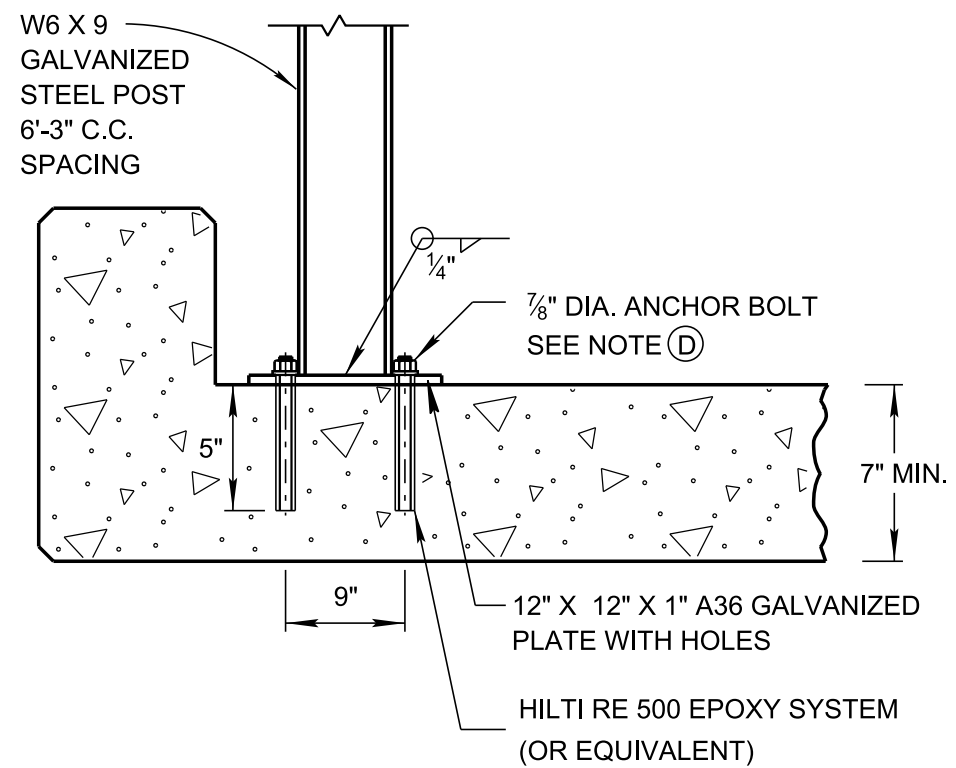
PLAN



ELEVATION VIEW

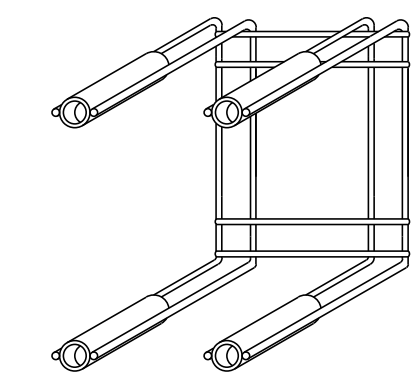


DETAIL A
INTERIOR WALL SHOWN,
EXTERIOR WALL SIMILAR.

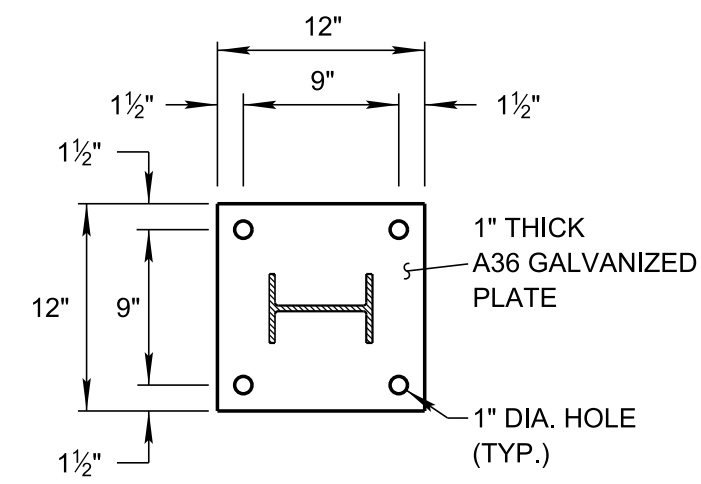


ALTERNATE DETAIL A

ALTERNATE POST ATTACHMENT
USING ANCHOR BOLTS
SEE BASEPLATE DETAILS

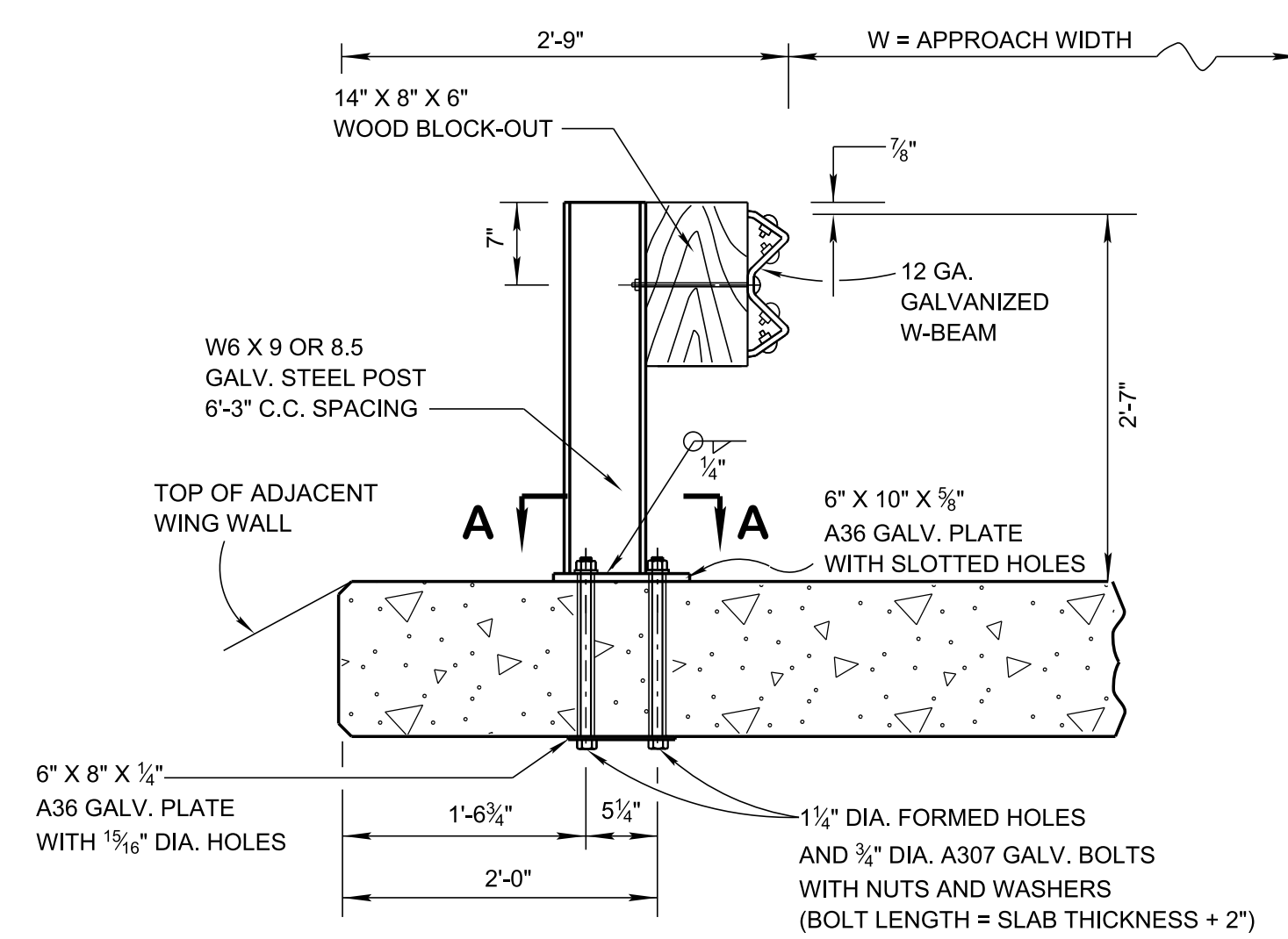


INSERT ASSEMBLY
FOR 3/4" DIA. X 4" HEX HEAD A307 BOLTS
(SEE NOTE (E))

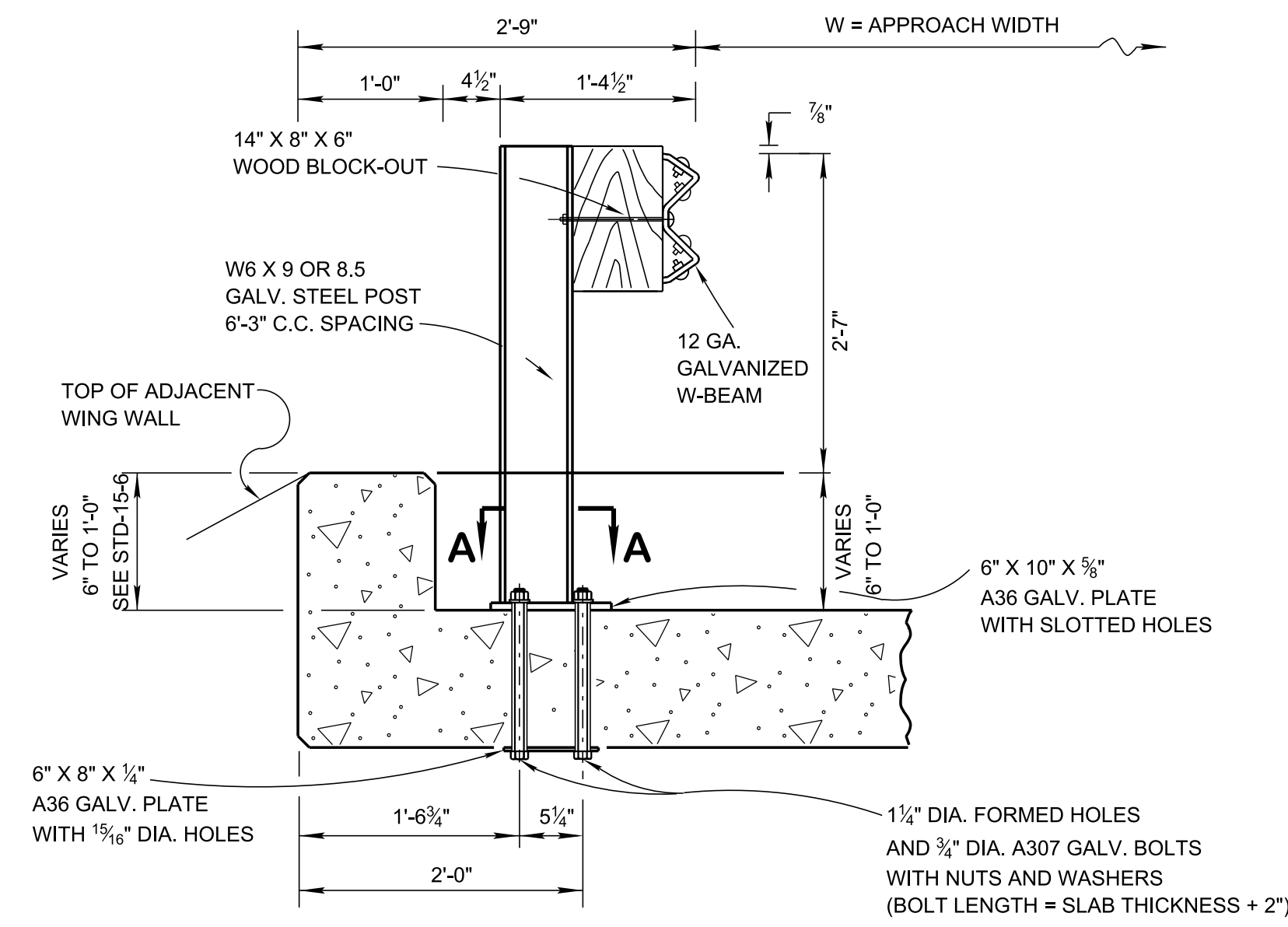


BASEPLATE DETAILS

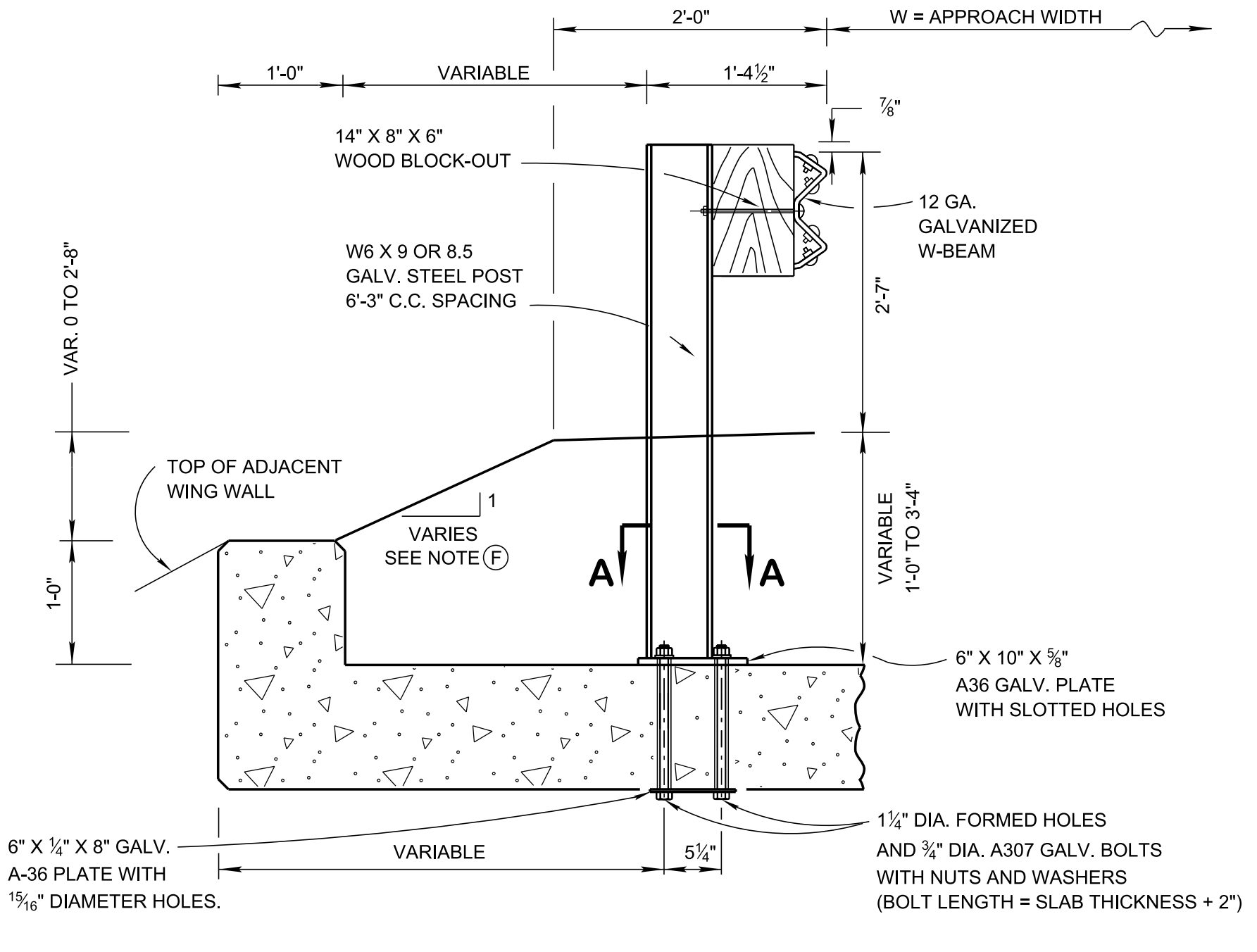
- REV. 5-25-16: CORRECTED WELD DETAIL.
- REV. 7-5-17: CORRECTED STD. DWG. NO'S. ON GENERAL NOTE (B). ADDED GENERAL NOTES (D), (E) AND (F). CHANGED PAY ITEM NUMBER IN DESIGN NOTE (1).
- REV. 06-28-19: REDREW SHEET.
- REV. 06-15-21: REVISED DETAIL A. SWITCHED LABELS ON ALTERNATE DETAIL A.



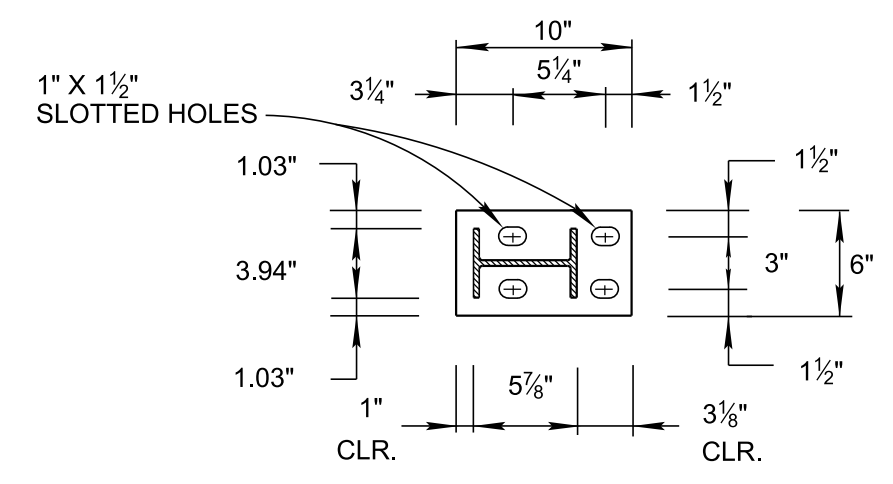
**DETAIL FOR CONCRETE DECK
USED AS A RIDING SURFACE**



**DETAIL FOR CONCRETE DECK
WITH 6" TO 1'-0" OF ROADWAY FILL COVER**



**DETAIL FOR CONCRETE DECK
WITH 1'-0" TO 3'-4" OF ROADWAY FILL COVER**



SECTION A-A

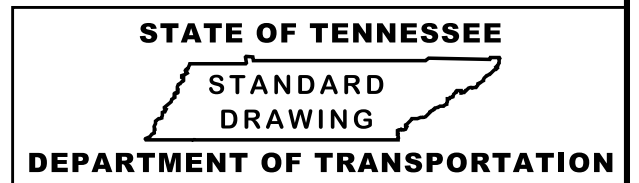
DESIGN NOTES

- (1) WHEN DEPTH OF FILL AT FACE OF GUARDRAIL EXCEEDS 3'-4", USE ITEM NUMBER 705-06.01 AS SHOWN ON S-GR31-1 SERIES.
- (2) DO NOT USE ON PRECAST CONCRETE STRUCTURE WITHOUT PRIOR APPROVAL FROM MANUFACTURERS.
- (3) THIS RAIL SYSTEM HAS BEEN TESTED AND PASSED BY THE CRITERIA SET FORTH BY AASHTO MASH TEST LEVEL 3, AS DOCUMENTED IN ROADSIDE SAFETY RESEARCH PROGRAM POOLED FUND STUDY NO. TPF-5(114) DATED NOV. 11, 2011.
- (4) ANY REINFORCING STEEL THAT INTERFERES WITH THE 1 1/4" DIAMETER FORMED HOLES SHALL BE MOVED HORIZONTALLY TO PROVIDE A 1" MINIMUM CLEARANCE TO THE HOLE.

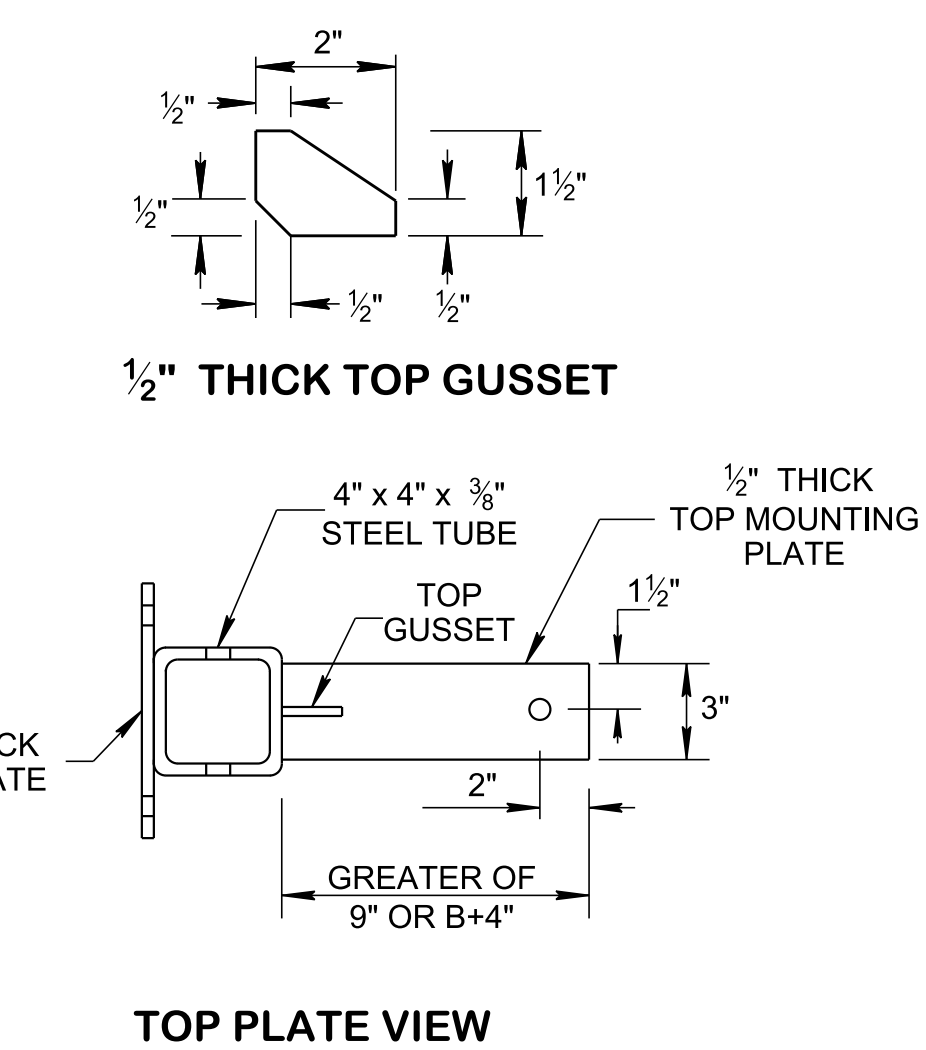
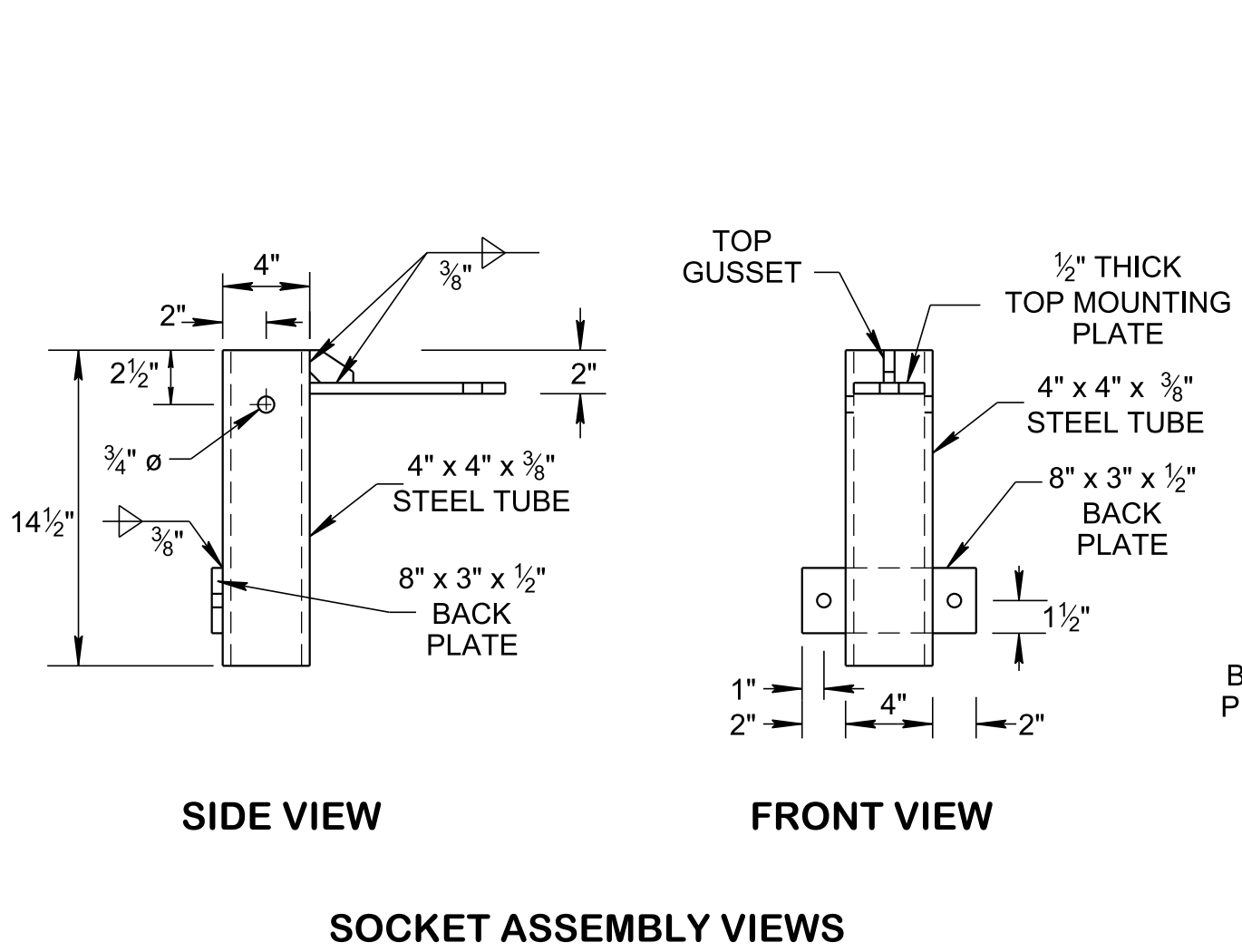
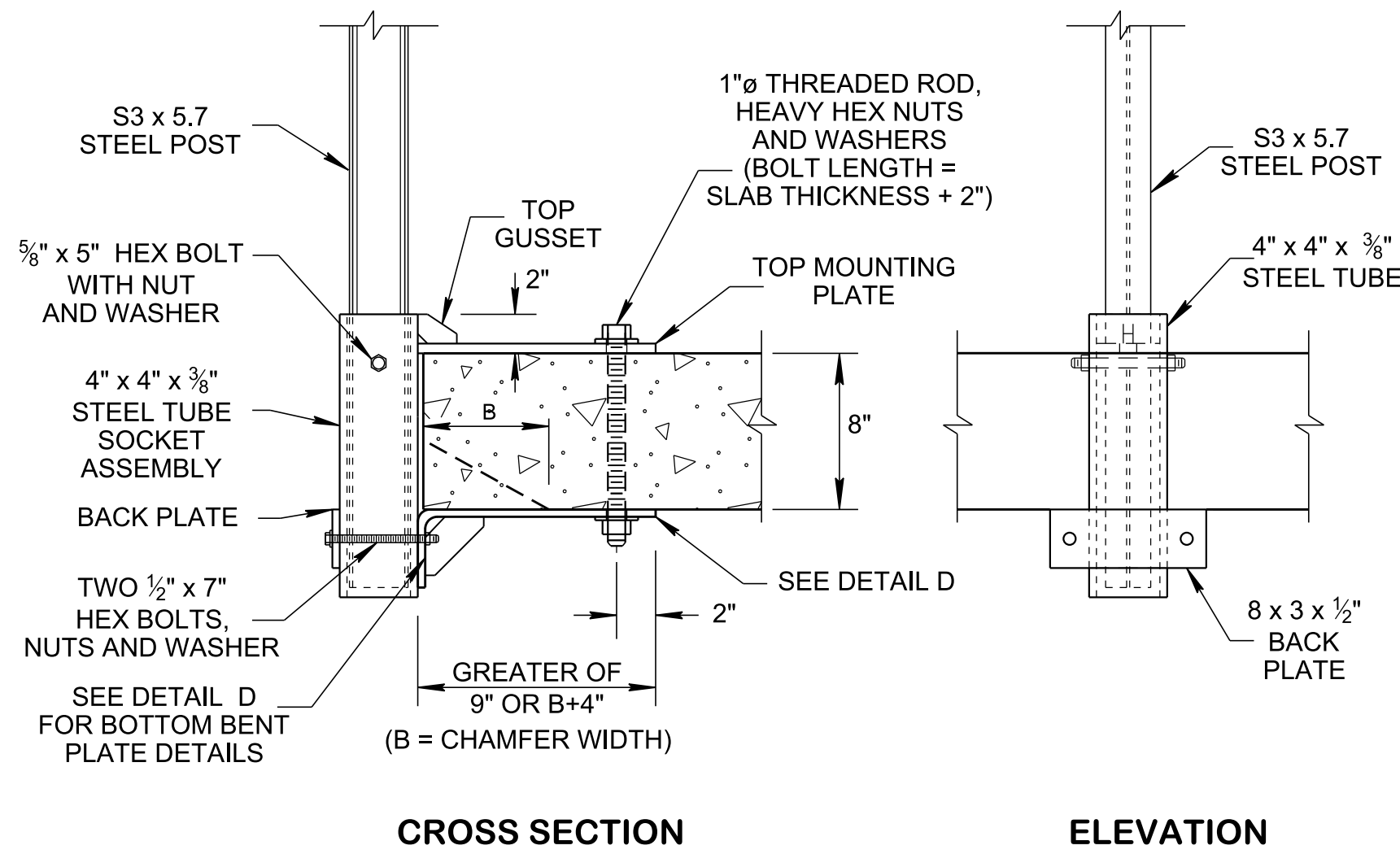
GENERAL NOTES

- (A) IN ORDER TO EXPEDITE INSTALLATION, GUARDRAIL POST MAY BE FIELD CUT TO ADJUST THE LENGTH REQUIRED. ALL CUT SURFACES MUST RECEIVE GALVANIZE COATING.
- (B) FOR DIMENSIONS AND DETAILS NOT SHOWN SEE STANDARD STRUCTURES DRAWING NOS. STD-17-7 AND STD-17-8, AND STANDARD ROADWAY DRAWING S-GR31-1 SERIES.
- (C) TO BE PAID FOR UNDER ITEM NO: 705-01.04, METAL BEAM GUARD FENCE, PER LF.
- (D) ANCHOR BOLTS TO BE 7/8" DIA., ASTM A193, GRADE B7. NUTS AND WASHERS TO BE GALVANIZED.
- (E) INSERT ASSEMBLY TO BE USED FOR CONNECTION OF POSTS OVER WALLS ONLY AND MAY NOT BE USED AS A SUBSTITUTE FOR PLATE ASSEMBLY ELSEWHERE.
- (F) SLOPE TO MATCH ADJOINING ROADWAY SIDE SLOPE.

■ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED



**SPECIAL CASE
GUARDRAIL
ATTACHMENT
TO CONCRETE
DECKS**

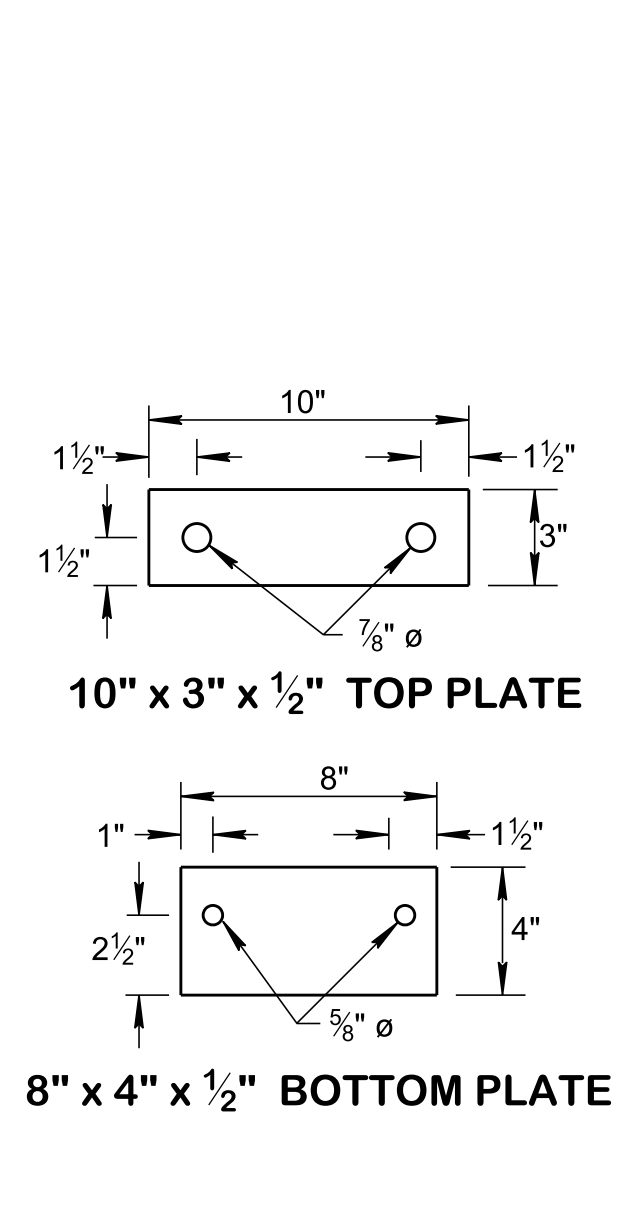
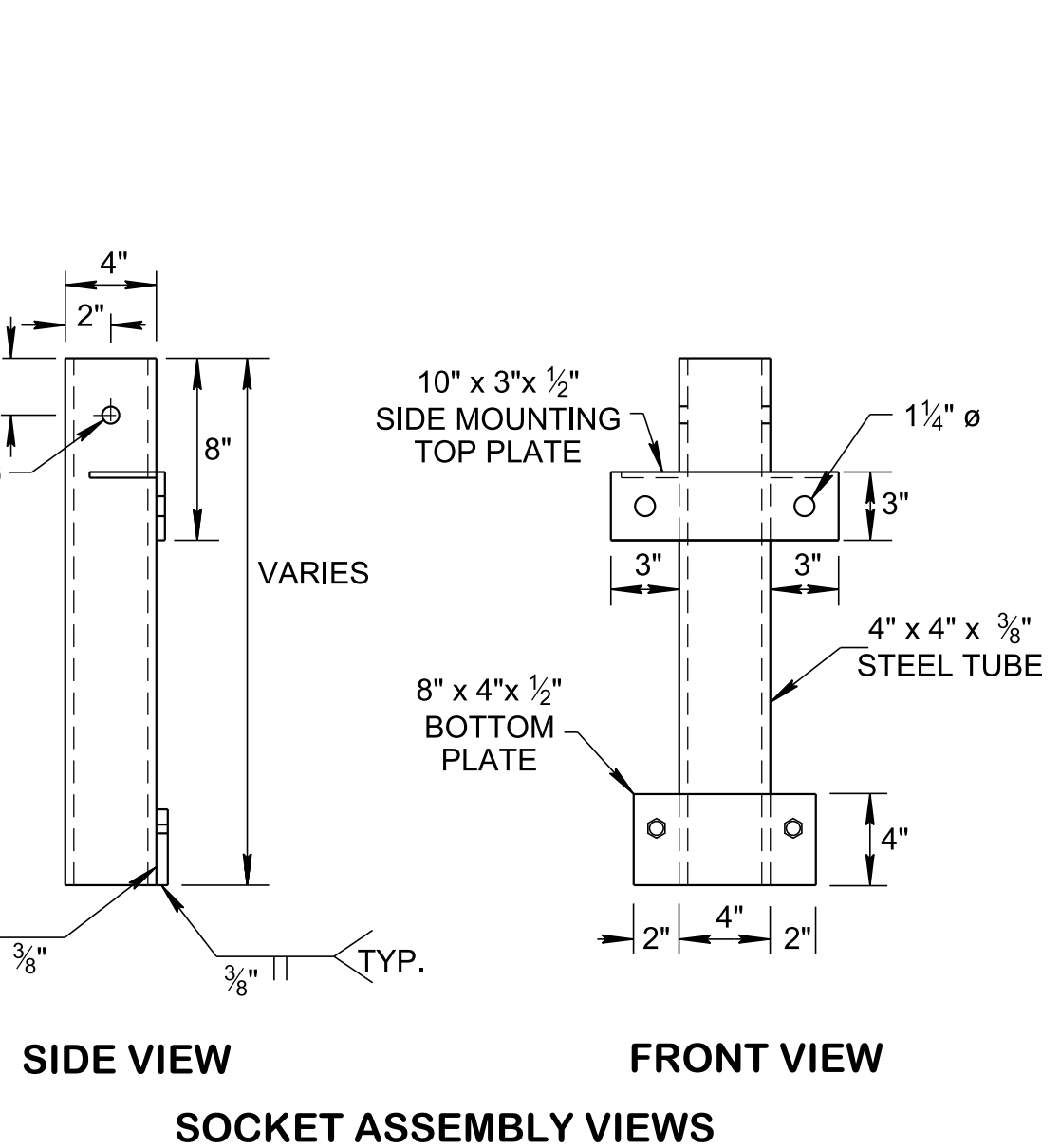
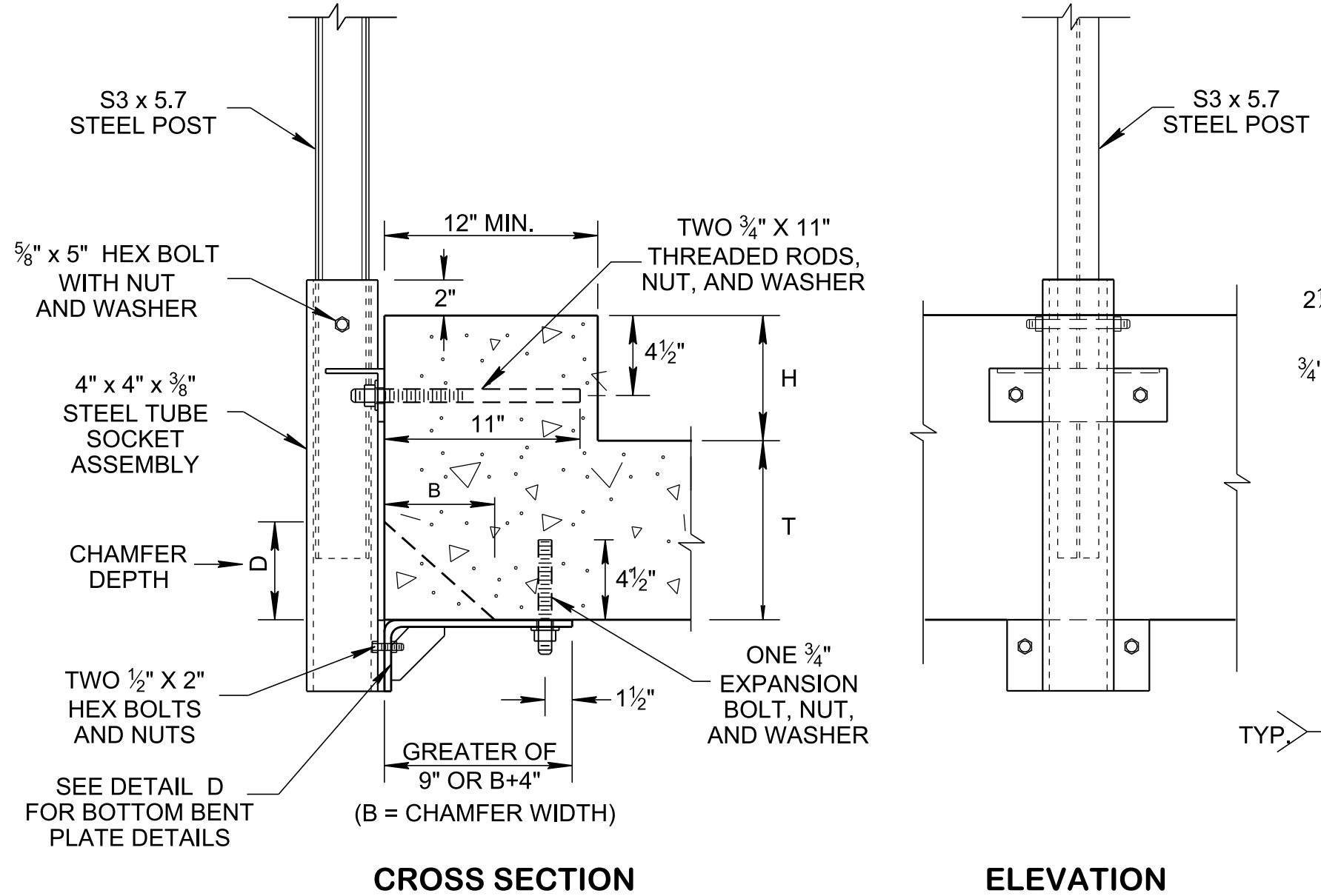


CROSS SECTION **ELEVATION**

TOP AND BOTTOM MOUNT- SINGLE ANCHOR- TYPE 1
FOR SLAB THICKNESS < 18"
SLAB USED AS A RIDING SURFACE
 (8" SLAB IS SHOWN)

SOCKET ASSEMBLY VIEWS **TOP PLATE VIEW**

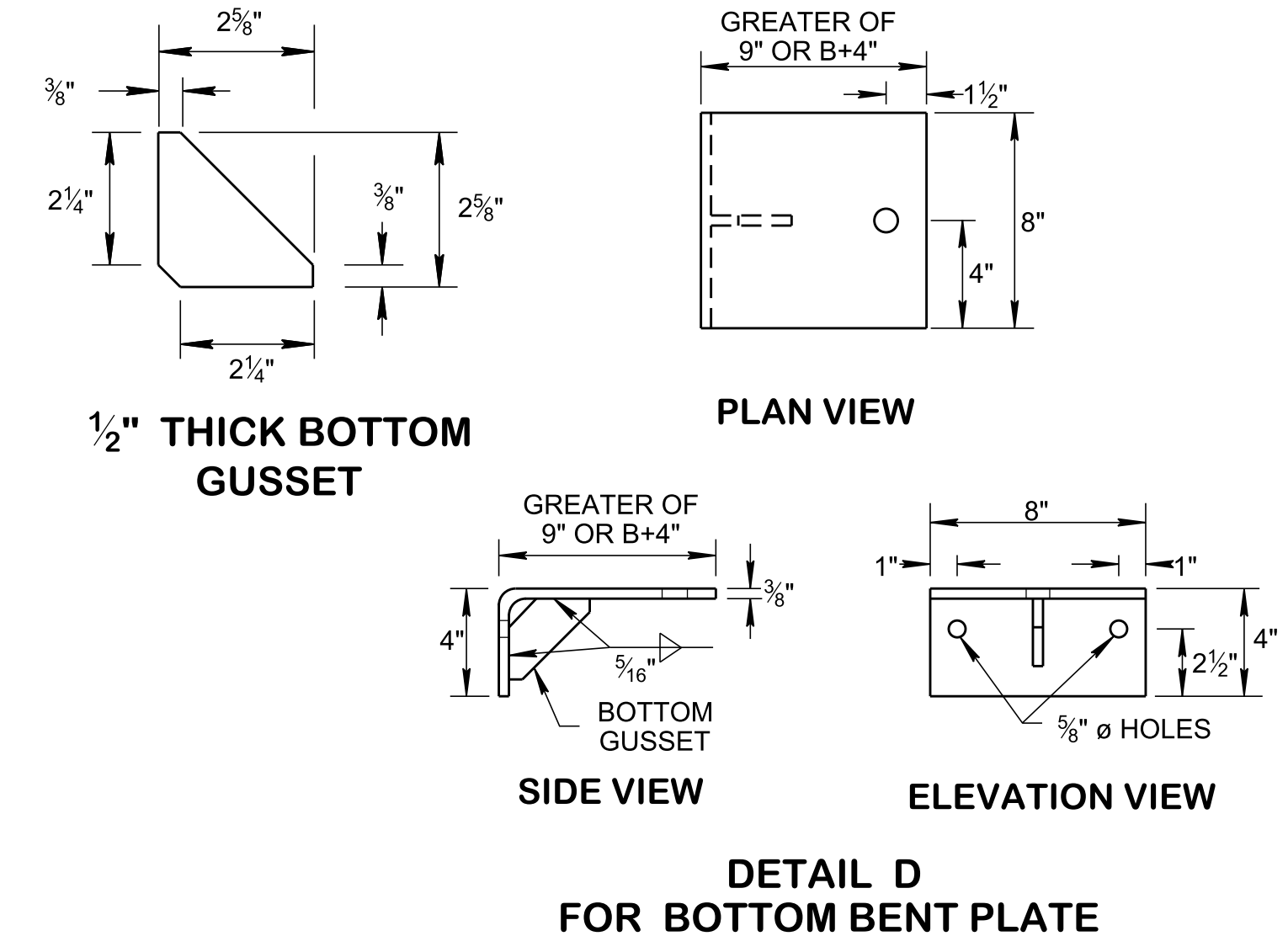
NOTE: HARDWARE DIMENSIONS NEED ADJUSTMENT FOR SLABS THICKER THAN 8".



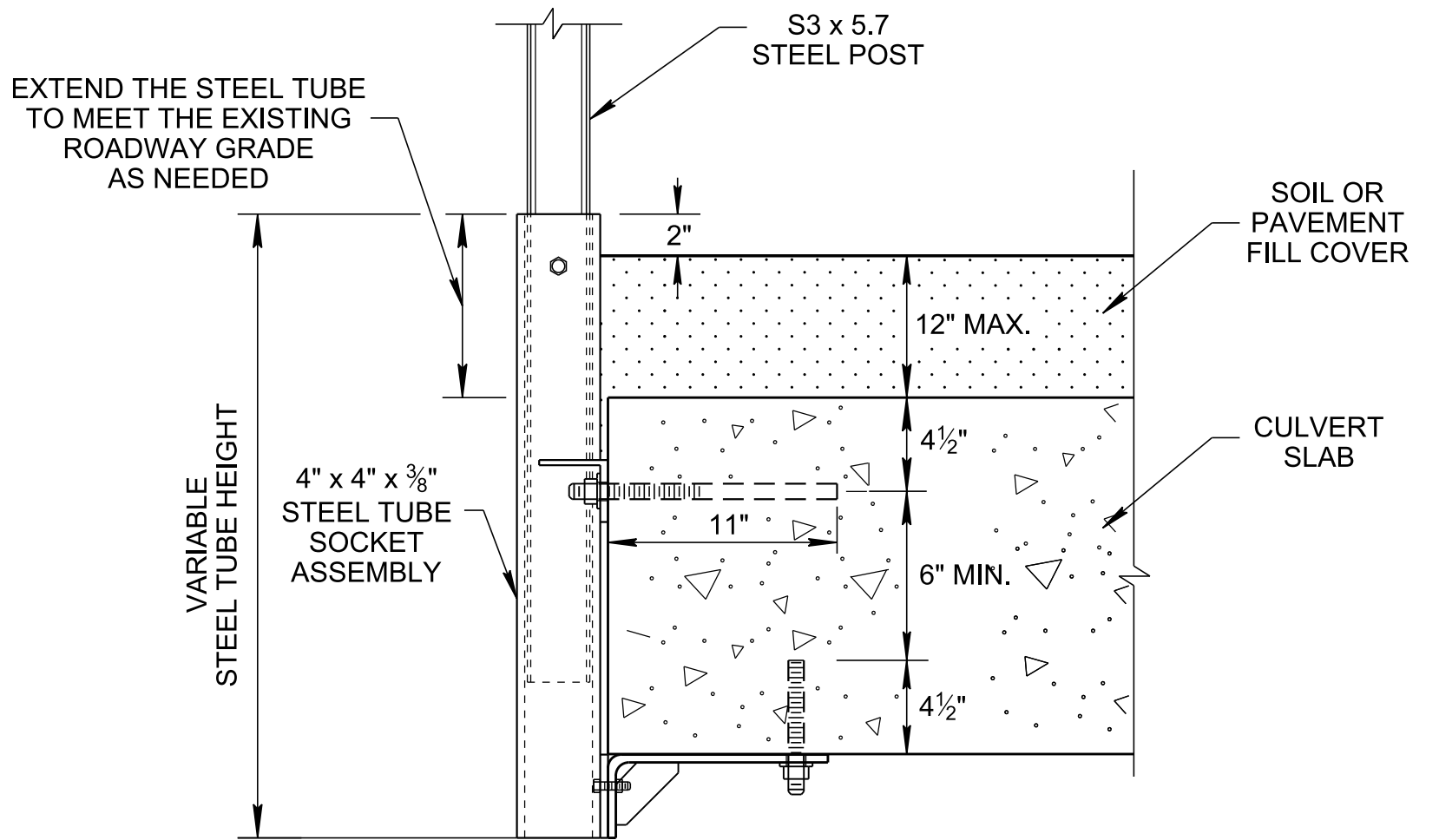
CROSS SECTION **ELEVATION**

SIDE AND BOTTOM MOUNT - TYPE 2
FOR (H + T - D) < 18"

SOCKET ASSEMBLY VIEWS **TOP PLATE** **BOTTOM PLATE**



DETAIL D
FOR BOTTOM BENT PLATE



ALT. DETAIL FOR SIDE AND BOTTOM MOUNT
WITH ROADWAY FILL COVER

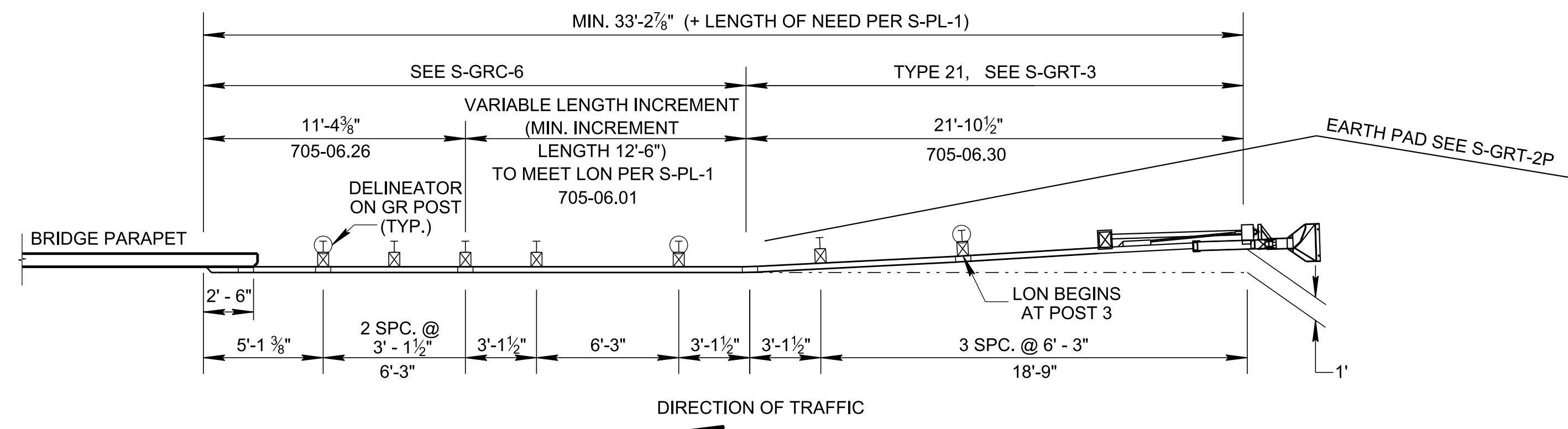
- GENERAL NOTES**
- (A) INSTALL THREADED ROD USING EPOXY ADHESIVE MATERIAL FROM QUALIFIED PRODUCT LIST.
 - (B) ALL THREADED RODS AND BOLTS SHALL BE INSTALLED WITH HEAVY HEX NUTS AND STANDARD WASHERS AND SHALL BE GALVANIZED. THREADED ROAD SHALL BE CONFORM TO ASTM A307/ ASTM F1554 GRADE 36, HEAVY HEX NUTS SHALL BE ASTM A563A AND 5/8" HEAVY HEX BOLT SHALL BE ASTM A325.
 - (C) THE SQUARE TUBE SHALL BE ASTM A500 GRADE B GALVANIZED STEEL.
 - (D) THE TOP AND BOTTOM MOUNTED PLATES AND GUSSET PLATE SHALL BE ASTM A572 GRADE 50 GALVANIZED STEEL. ALL MOUNTING ASSEMBLY SHALL BE GALVANIZED AFTER WELDING.
 - (E) ALL WELDING SHALL BE PERFORMED BY A WELDER QUALIFIED IN ACCORDANCE WITH THE AASHTO/AWS D1.5M/D1.5 BRIDGE WELDING CODE (LATEST EDITION).
 - (F) PAYMENT FOR ASSEMBLY ELEMENTS SUCH AS SQUARE TUBE, HARDWARE INCLUDING DRILLING AND INSTALLING THREADED RODS, NUTS AND BOLTS, WASHERS AND ALL PLATES WILL BE INCLUDED IN THE WEAK-POST GUARDRAIL ITEM NUMBER.

STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

WEAK-POST GUARDRAIL ASSEMBLY DETAILS FOR TYPE 1 & 2

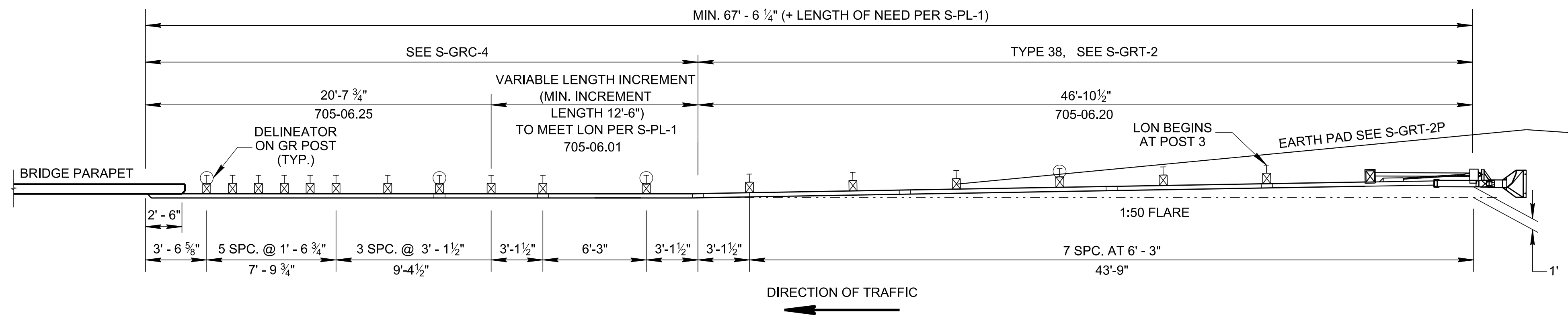
7/27/2021 10:31:11 AM P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IPY106.06 Guardrail (Special Cases) IPYIGRS5A-20

7/16/2021 8:04:10 AM
 P:\StandDraw\DESIGN STANDARDS\Standards Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.01 Clear Zone & Safety Plans IP\SP3-2021



PLAN FOR TYPE 21
MINIMUM INSTALLATION LENGTH FOR TL-2 GUARDRAIL TERMINAL
(FOR LOW SPEED FACILITIES V < 45 MPH)

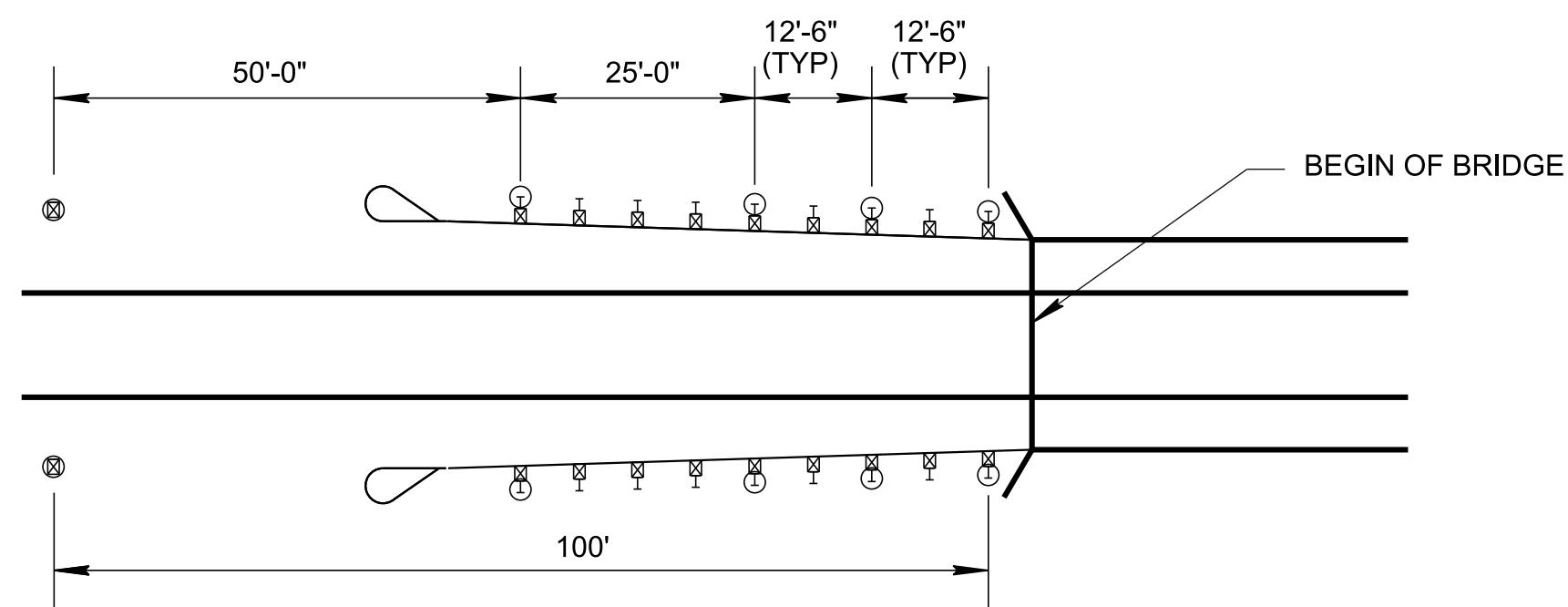
SAFETY PERFORMANCE OF SLOTTED GUARDRAIL TERMINAL IS ACCEPTABLE ACCORDING TO THE TL-2 EVALUATION CRITERIA SPECIFIED IN AASHTO MASH. SLOTTED GUARDRAIL TERMINAL MAY BE USED ON ALL LOW SPEED ROADS ON THE NATIONAL HIGHWAY SYSTEM WHEN THE CURRENT DESIGN SPEED IS LESS THAN 45 MPH. EARTH PAD IS REQUIRED AS SHOWN ON S-GRT-2P. FOR LOW SPEED LOCAL ROADS WITH ADT<2000 VEH/DAY, S-GRC-6 MAY BE USED.



PLAN FOR TYPE 38
MINIMUM INSTALLATION LENGTH FOR TANGENTIAL GUARDRAIL END TERMINAL

SAFETY PERFORMANCE OF TANGENTIAL GUARDRAIL TERMINAL END SHALL MEET THE TL-3 EVALUATION CRITERIA SPECIFIED IN AASHTO MASH. ONLY TERMINALS LISTED ON QPL LIST SHALL BE USED. EARTH PAD IS REQUIRED AS SHOWN ON S-GRT-2P AS DESCRIBED ON THE DRAWING.

LEGEND	
	DELINEATOR ON GUARDRAIL POST
	DELINEATOR



MIN. DELINEATOR PLACEMENT
AT BRIDGE APPROACHES INSTALLED
ON GUARDRAIL POSTS

GENERAL NOTES	
(A)	THIS DRAWING SHALL BE USED FOR BRIDGE ENDS OR RIGID CONCRETE BARRIER WALL ENDS ONLY. FOR OTHER HAZARDS, S-PL-1 SHALL BE USED TO DETERMINE LENGTH OF NEED FOR GUARDRAIL.
(B)	SEE S-GRC SERIES FOR DETAILS AND SPECIFICATIONS REGARDING INSTALLATION OF PROTECTIVE GUARDRAIL AT BRIDGE ENDS AND S-GRT SERIES FOR GUARDRAIL END TERMINAL DETAILS.
(C)	IF A FIELD EVALUATION DISCOVERS A SECONDARY HAZARD, THEN S-PL-1 SHALL BE USED TO DETERMINE LENGTH OF NEED.
(D)	AT LOCATIONS WHERE THE ABOVE SHOWN MINIMUM TRANSITION AND GUARDRAIL TERMINAL ANCHOR CANNOT BE INSTALLED DUE TO A SIDE ROAD OR DRIVEWAY, OTHER ALTERNATIVES SHALL BE CONSIDERED SUCH AS CURVED GUARDRAIL (S-PL-2) OR INTRODUCING A NON-GATING ATTENUATOR.
(E)	SEE T-M-18 FOR FLEXIBLE DELINEATOR DETAILS. DELINEATORS PLACEMENT ON BRIDGE APPROACHES ARE AS SHOWN IN THIS DRAWING OR AS DIRECTED BY REGIONAL TRAFFIC ENGINEER. FOR ADDITIONAL INFORMATION SEE SECTION 3F OF THE MUTCD (CURRENT EDITION)

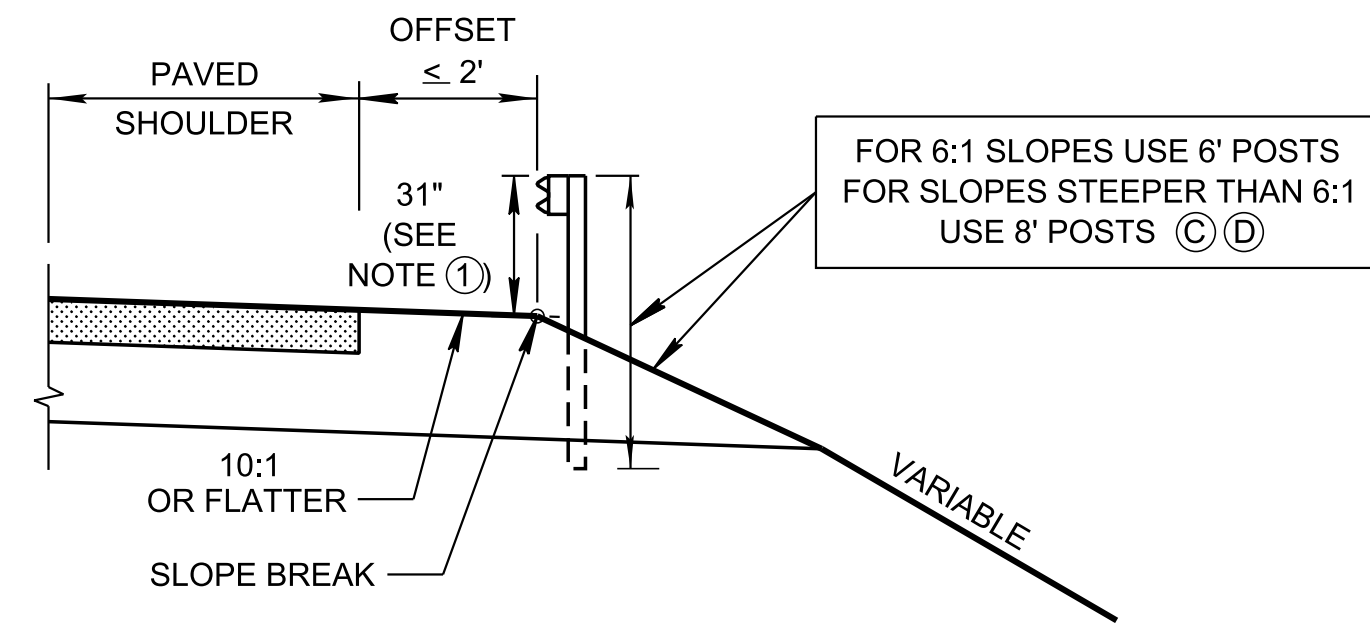
MINOR REVISION -- FHWA
 APPROVAL NOT REQUIRED

STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

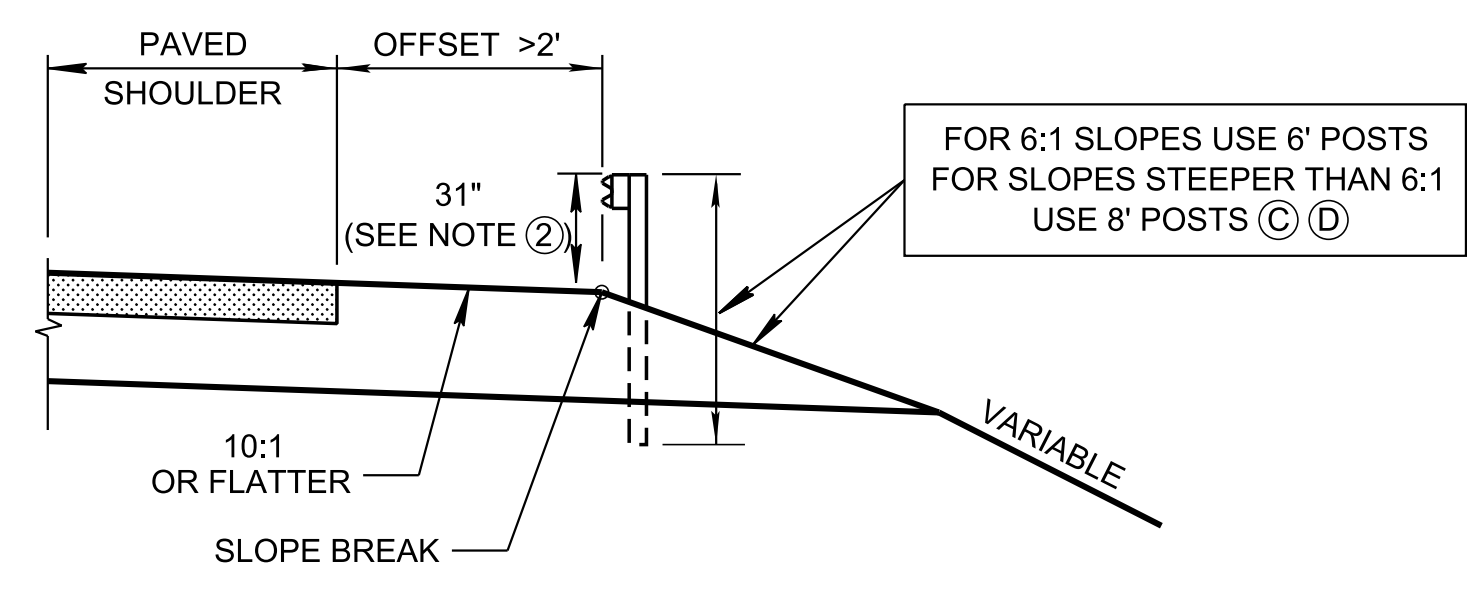
SAFETY PLAN
MINIMUM
INSTALLATION
AT BRIDGE
ENDS

REV. 10-10-16: UPDATED REFERENCES TO OTHER STANDARD DRAWINGS. UPDATED LENGTH OF TYPE 38 TERMINAL AND MODIFIED PLAN VIEW FOR TYPE 38 TERMINAL.
 REV. 06-28-19: UPDATED TO MASH GUARDRAIL ITEM NUMBERS. REDREW SHEET.
 REV. 06-15-21: REVISED THE DRAWINGS. REMOVED DELINEATOR NOTES AND STEEL POST DETAIL. REVISED GENERAL NOTE (B) AND ADDED GENERAL NOTE (E).

7/16/2021 11:12:46 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.01 Clear Zone & Safety Plans IP\SP\6-2021

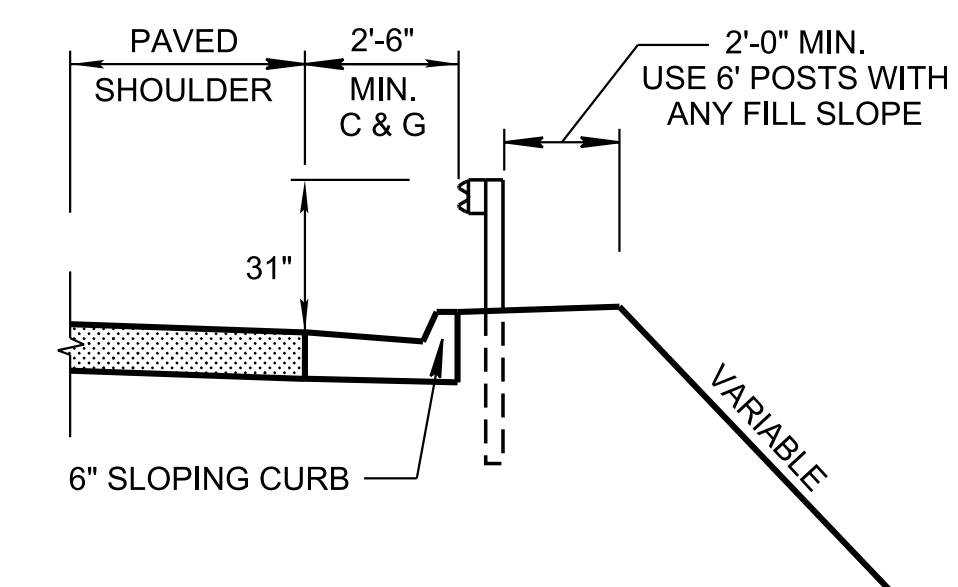


DETAIL A
GUARDRAIL PLACEMENT AT SLOPE BREAK WITH LESS THAN 2'-0" OFFSET

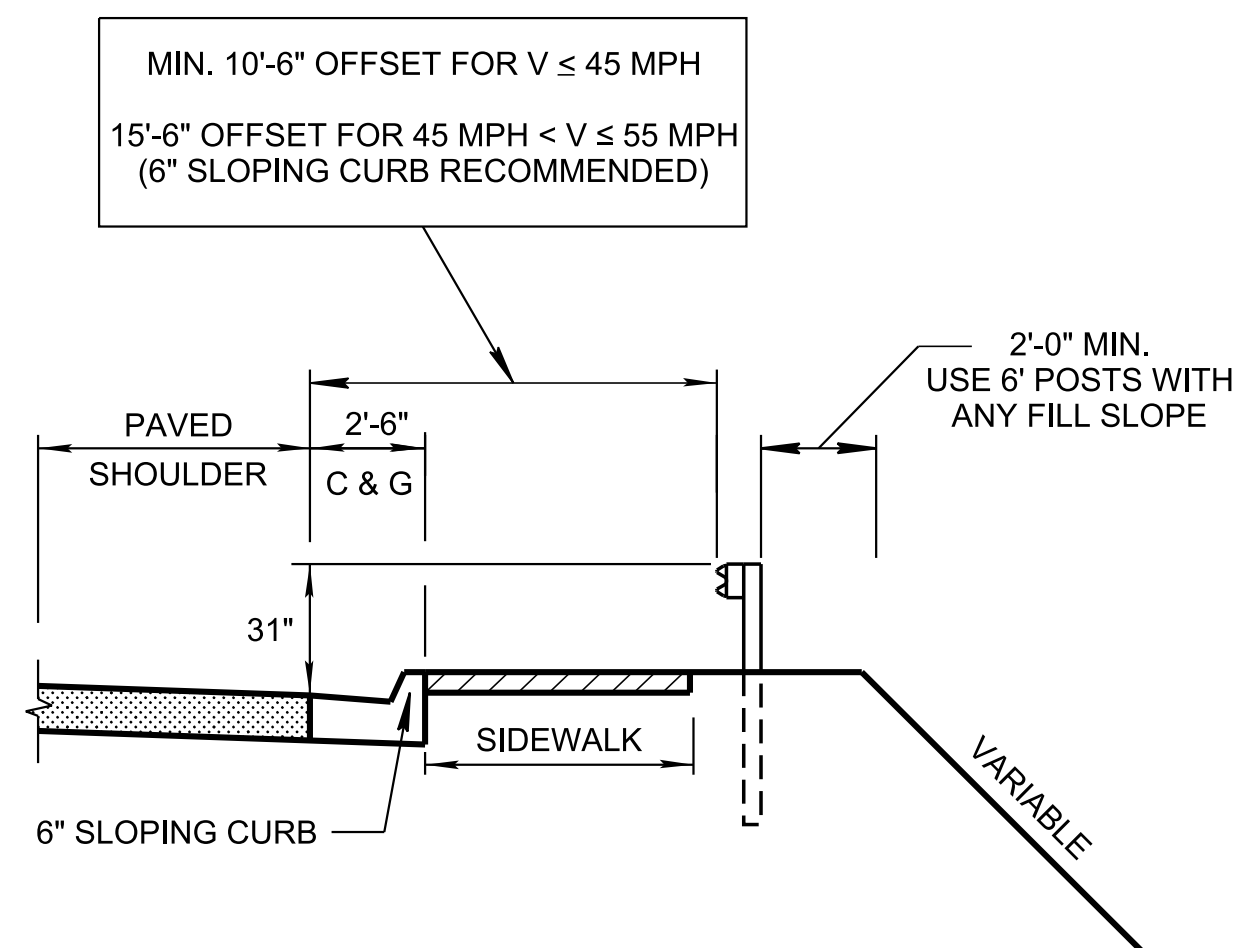


DETAIL B
GUARDRAIL PLACEMENT AT SLOPE BREAK WITH MORE THAN 2'-0" OFFSET

TYPICAL SECTIONS (NON CURB & GUTTER)



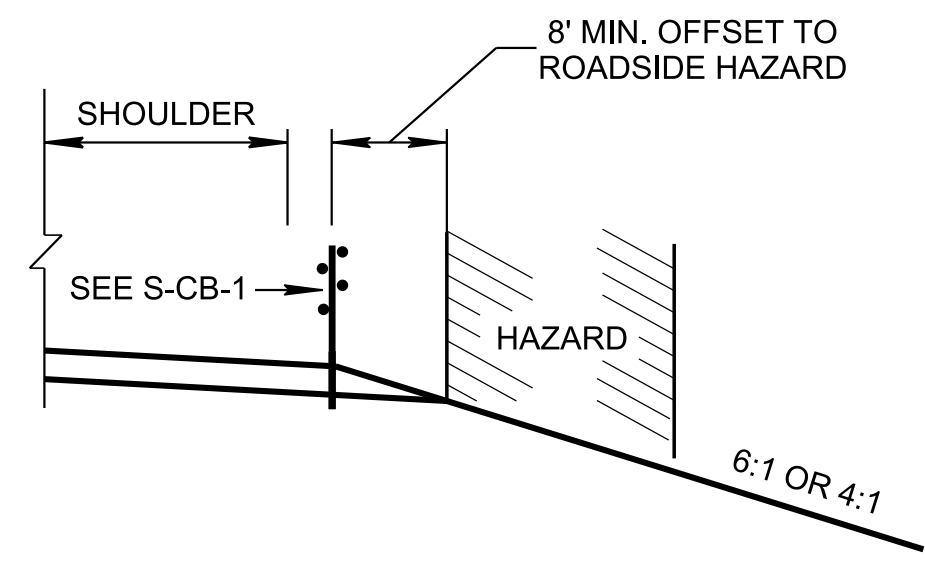
DETAIL C
GUARDRAIL PLACEMENT ON CURB AND GUTTER SECTION



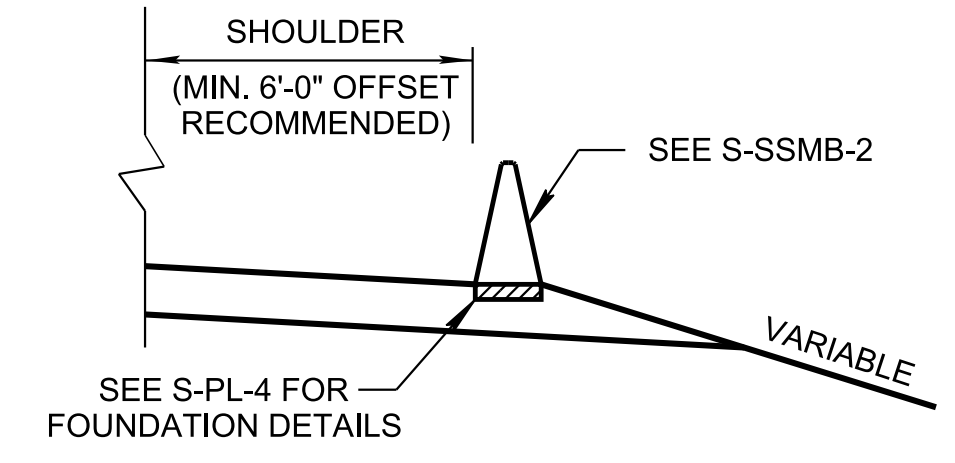
DETAIL D
OFFSET GUARDRAIL PLACEMENT ON CURB AND GUTTER SECTION
(REFER TO MM-TS SERIES FOR PROVIDING ADDITIONAL GUIDANCE ACCOMMODATING OTHER USERS)

TYPICAL SECTIONS WITH CURB AND GUTTER

USE 6" SLOPING CURB AT LOCATIONS WHERE THE POSTED SPEED IS BETWEEN 45 - 55 M.P.H. DO NOT USE CURB AND GUTTER AT LOCATIONS WHERE THE POSTED SPEEDS ARE ABOVE 55 M.P.H.



DETAIL E
HIGH TENSION 4 STRAND CABLE BARRIER (TL-3 OR TL-4)

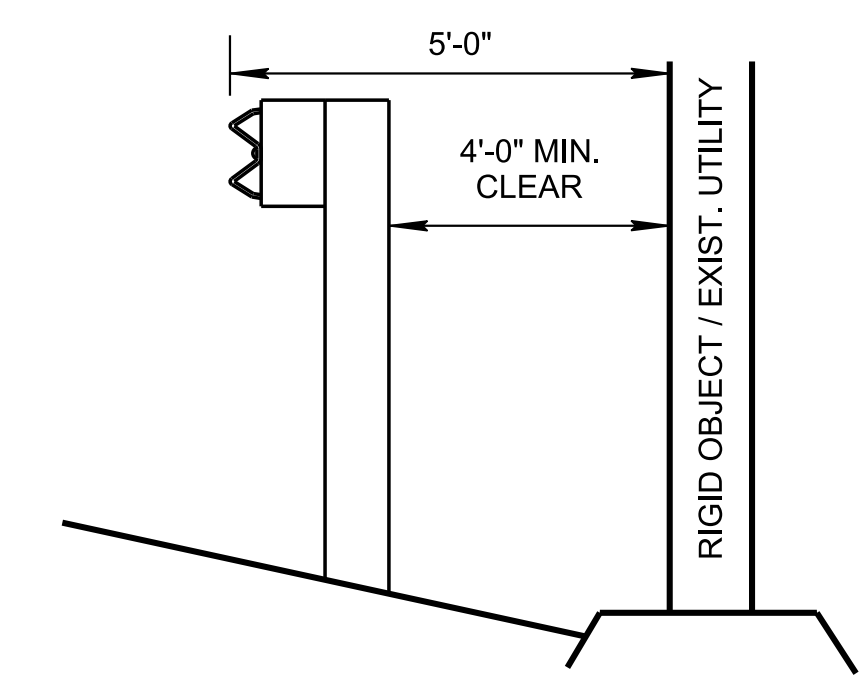


DETAIL F
FREE STANDING CONCRETE BARRIER RAIL (TL-3, TL-4 OR TL-5)

ALTERNATE TO W-BEAM GUARDRAIL WHERE HIGHER PERFORMANCE IS NEEDED

NOTES FOR MEASURING THE HEIGHT OF GUARDRAIL :

- 1 IF THE GUARDRAIL IS WITHIN 2 FEET OF THE SHOULDER, THE GUARDRAIL HEIGHT IS MEASURED BY EXTENDING THE SHOULDER SLOPE (SEE DETAIL A).
- 2 IF THE GUARDRAIL IS 2 FEET OR MORE AWAY FROM THE SHOULDER, THE GUARDRAIL HEIGHT IS MEASURED FROM THE GROUND (SEE DETAIL B).



TYPICAL MIN. CLEAR TO A RIGID OBJECT
(SEE TABLE BELOW IF LESS DEFLECTION IS DESIRED)
(REFER TO MWRSF REPORT TRP 03-171-06)

GUARDRAIL POST REDUCTION IN DEFLECTION FOR SINGLE W-BEAM			
POST SPACING	6' - 3"	3' - 1 1/2"	1' - 6 3/4"
DEFLECTION	3' - 6"	3' - 0"	2' - 6"

NOTE: THE DEFLECTION DISTANCE SHOWN ON THE ABOVE TABLE IS FOR GUIDANCE ONLY. THE ACTUAL DEFLECTION DISTANCE MAY BE LESS THAN AS SHOWN.

GENERAL NOTES TO DESIGNER

(A) IF GUARDRAIL IS IN A CURB AND GUTTER SECTION, IT SHALL BE PLACED SUCH THAT THE GUARDRAIL FACE IS EVEN WITH THE BACK OF THE CURB (DETAIL C) OR A MINIMUM OF 8' FROM THE CURB (DETAIL D).

(B) REFER TO RD11-TS SERIES OF STANDARD DRAWINGS FOR ROADWAY TYPICAL SECTIONS.

(C) REFER TO TEXAS A & M REPORT NUMBER 405160-20, FOR GUARDRAIL PLACED ON 2:1 SLOPE.

(D) PAY ITEMS:
705-06.01, W BEAM GR (TYPE 2) MASH TL3, L.F. (6' POST)
705-06.02, W BEAM GR (TYPE 2) MASH TL3 (LONG POST), L.F. (8' POST)

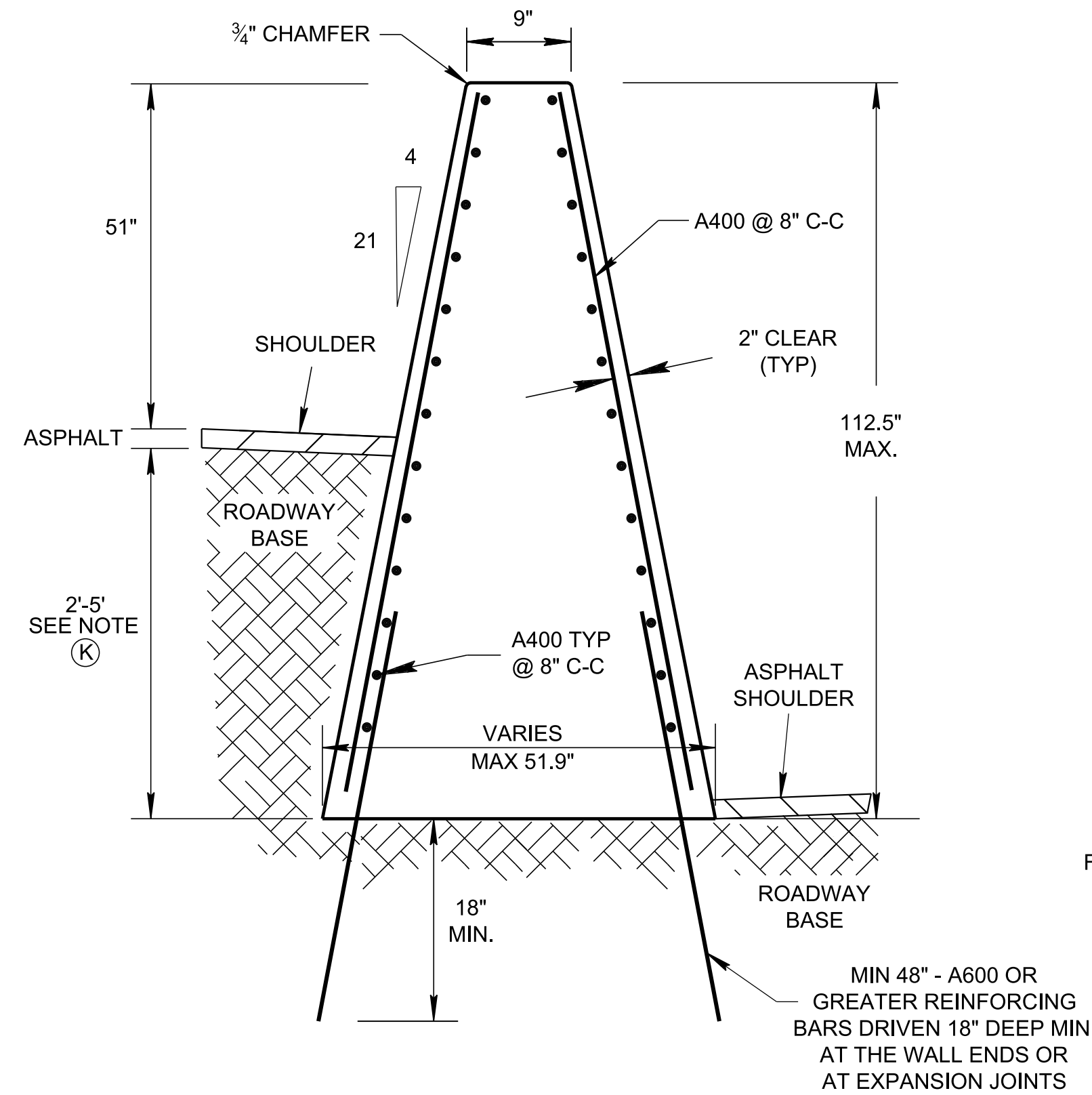
REV. 12-1-14: ADDED NOTE TO DETAIL E MINOR DRAFTING UPDATE. ADDED TABLE.
REV. 4-4-16: GENERAL REVISION.
REV. 06-28-19: ADDED GENERAL NOTE (E) AND (F). REVISED TABLE FOR GUARDRAIL POST REDUCTION IN DEFLECTION FOR SINGLE W-BEAM. REVISED DETAILS A THRU E. REMOVED TABLE A. REDRAW SHEET.
REV. 06-15-21: REVISED ALL DETAILS. DELETED GENERAL NOTES (A) AND (C). ADJUSTED LOCATION OF GENERAL NOTE NO'S. REVISED GENERAL NOTES (E) AND (F). ADDED NOTES UNDER DEFLECTION TABLE AND FOR GUARDRAIL HEIGHT MEASUREMENT.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

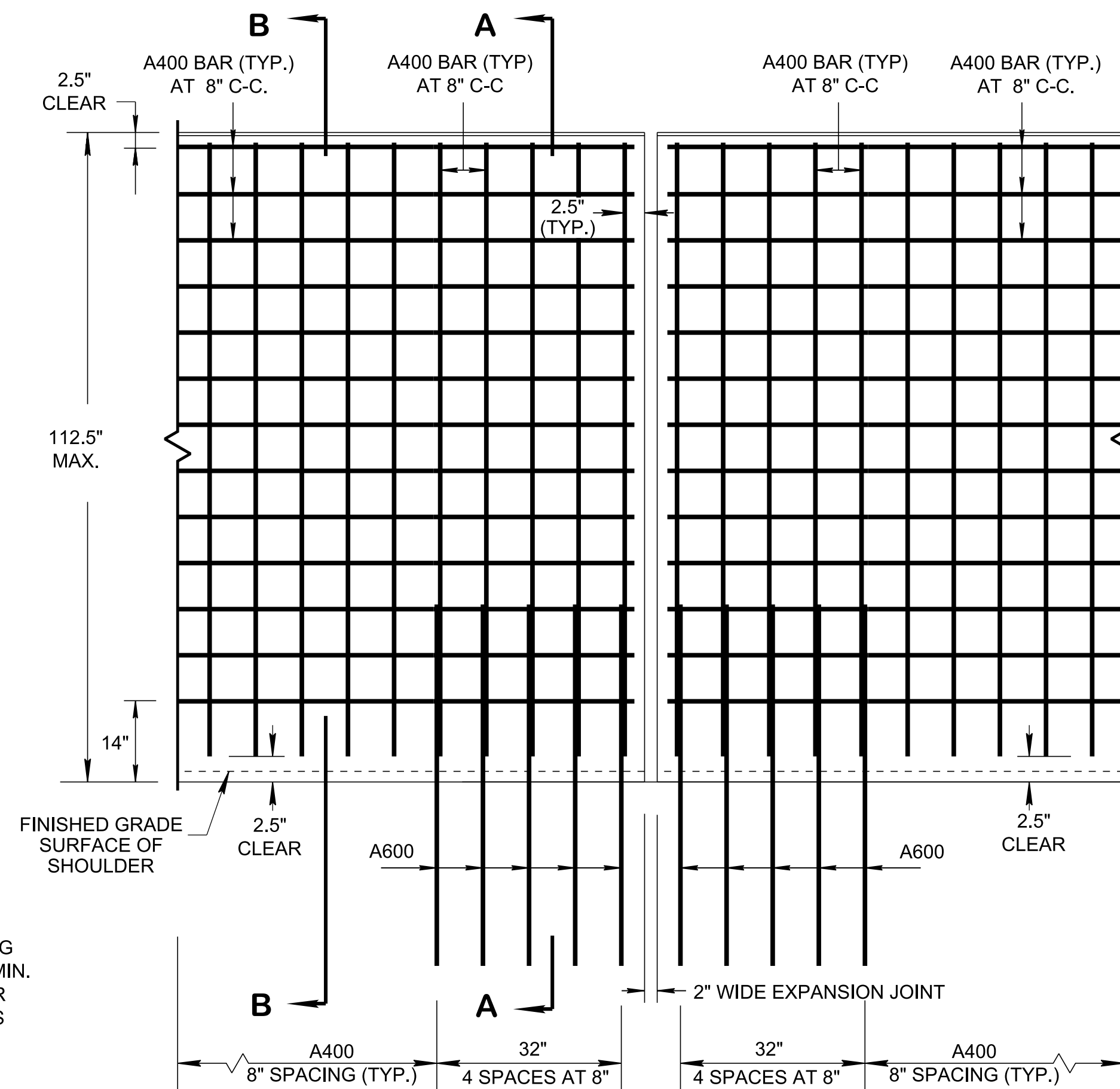
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SAFETY PLAN
SAFETY HARDWARE
PLACEMENT
ON OUTSIDE
EDGE

6/16/2021 9:08:26 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-106.00 Safety Design and Guardrails IP\106.09 Concrete Median Barriers IP\SSMB9-20



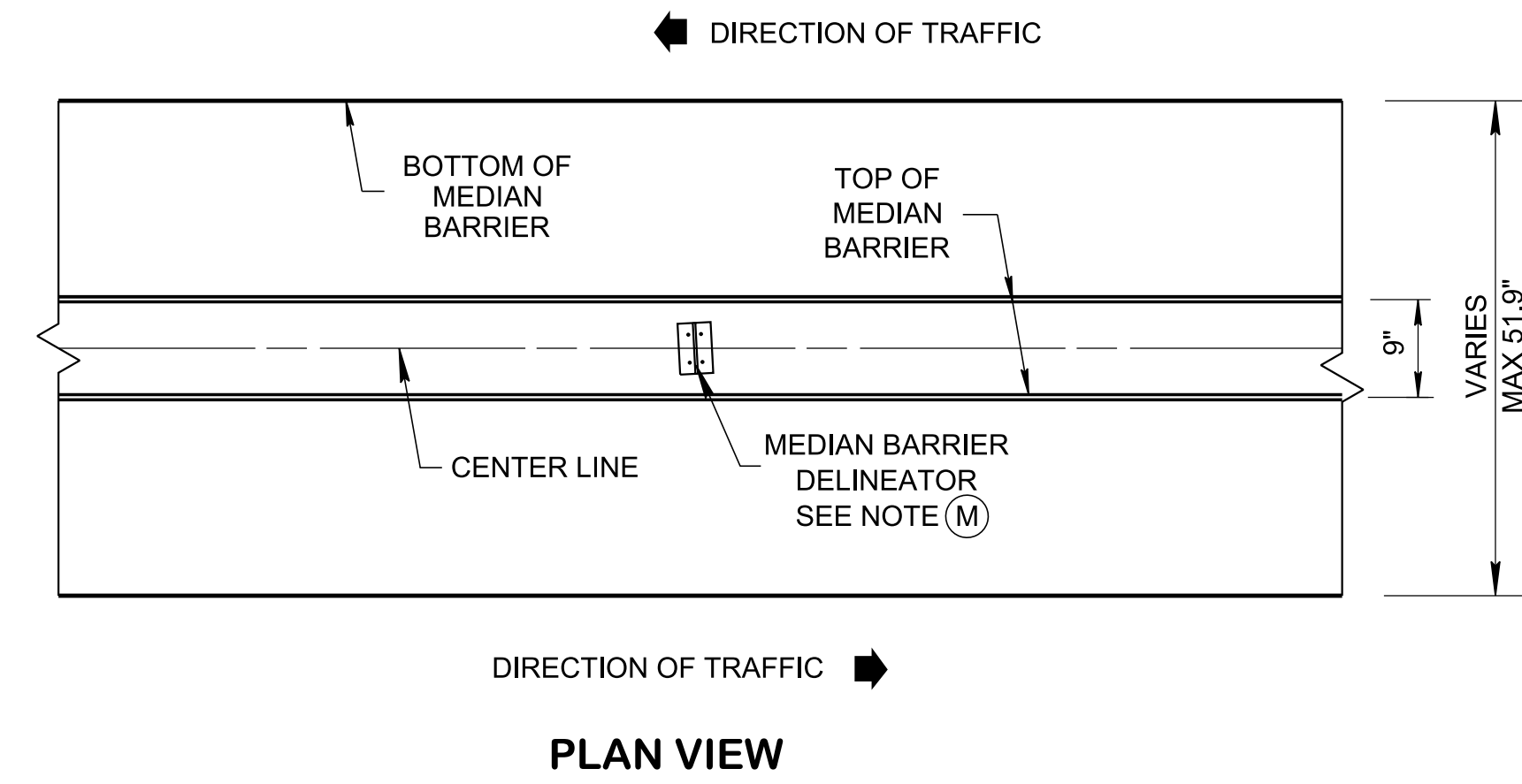
SECTION A-A
TYPICAL AT THE WALL ENDS
OR AT EXPANSION JOINTS



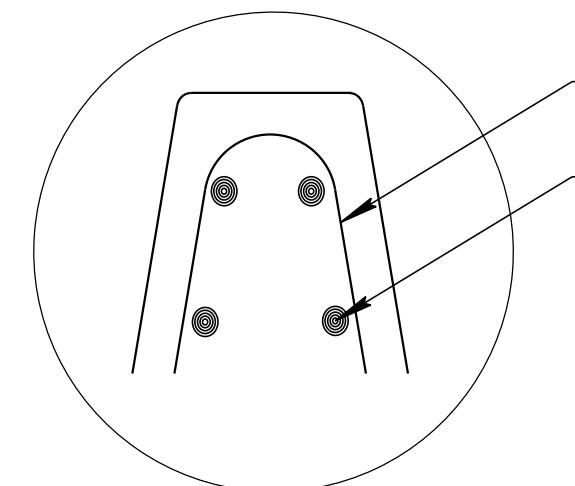
ELEVATION VIEW
ANCHORING REINFORCEMENT DETAIL

NOTE: ALL A400 AND A600 REINFORCING STEEL BARS ARE TO BE EPOXY COATED MEETING ALL REQUIREMENTS OF ASTM D3963.

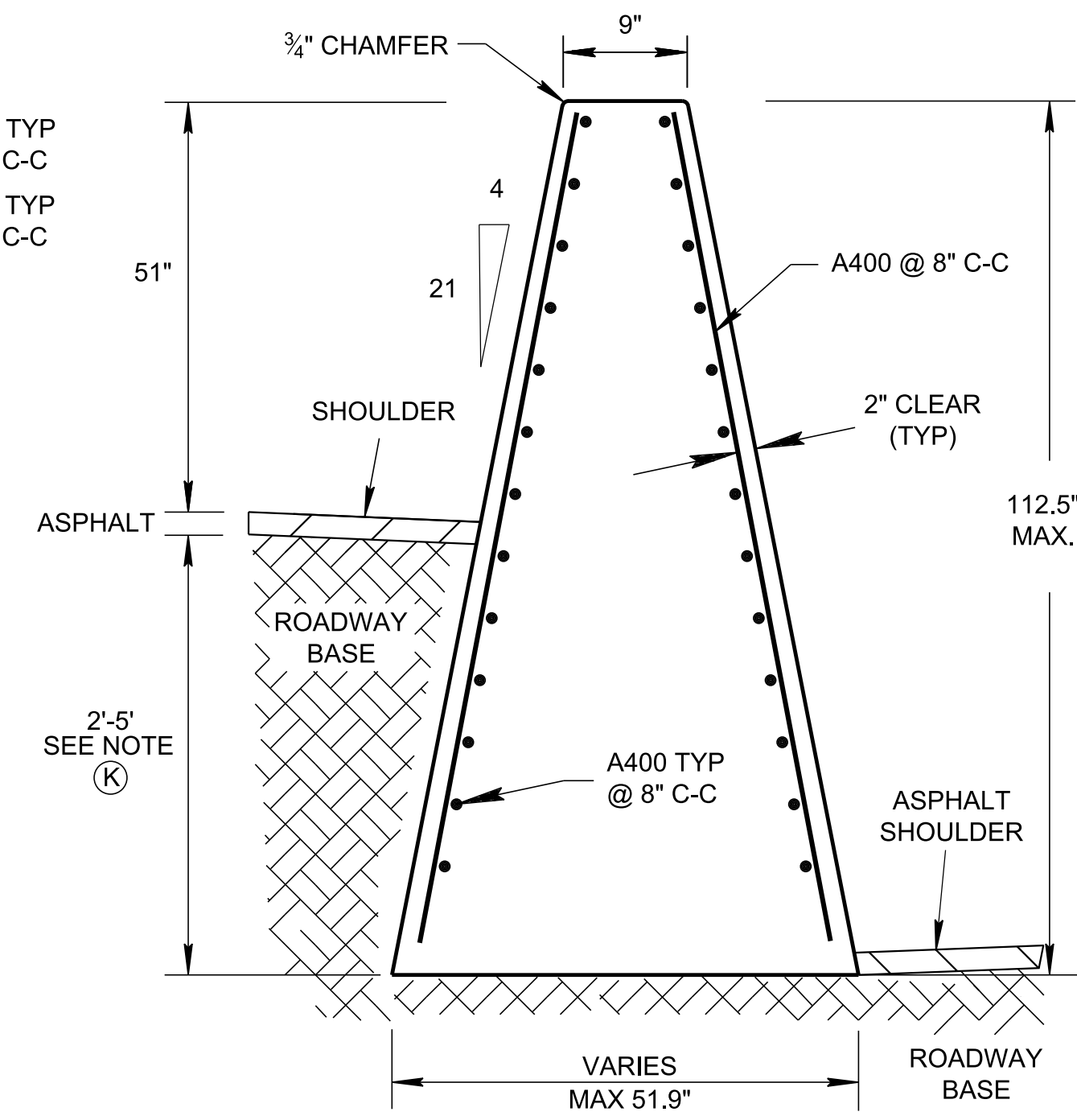
REINFORCING STEEL LEGEND	
VARIABLE	A400
48"	A600



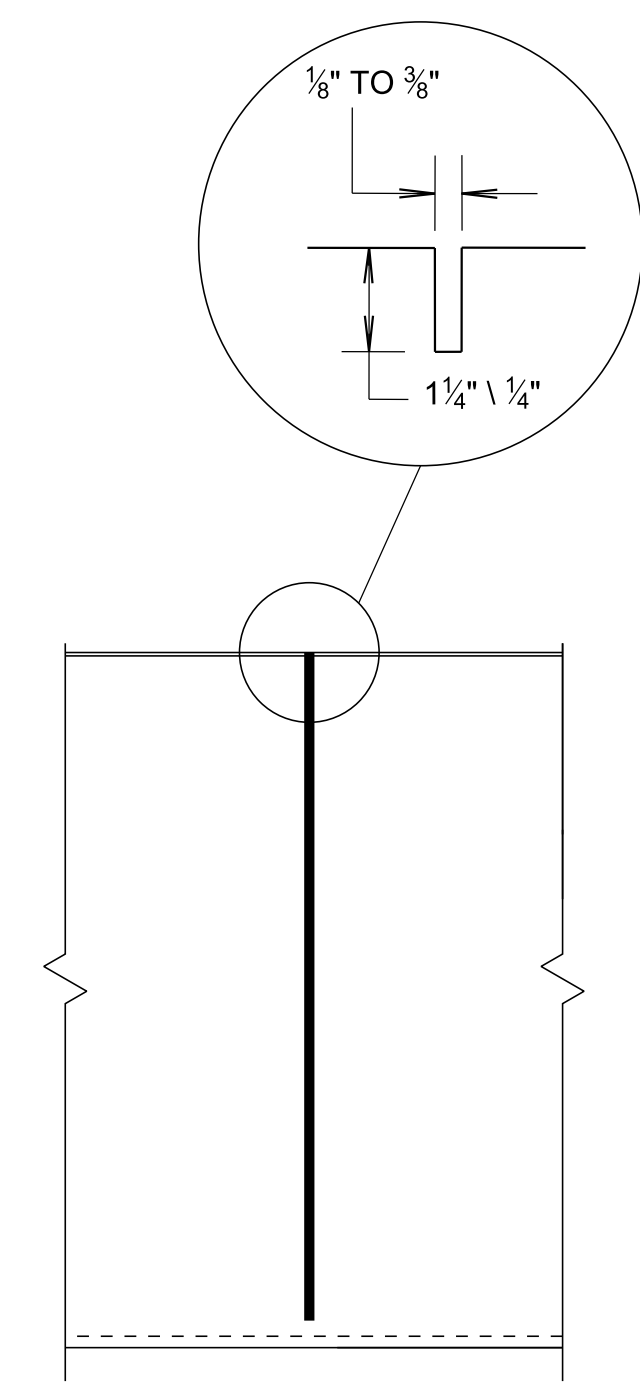
PLAN VIEW



ALTERNATIVE DETAIL
SEE NOTE (L)



SECTION B-B
TYPICAL AT THE INTERMEDIATE WALL



CONTRACTION JOINT DETAIL
SEE NOTES (B) AND (C)

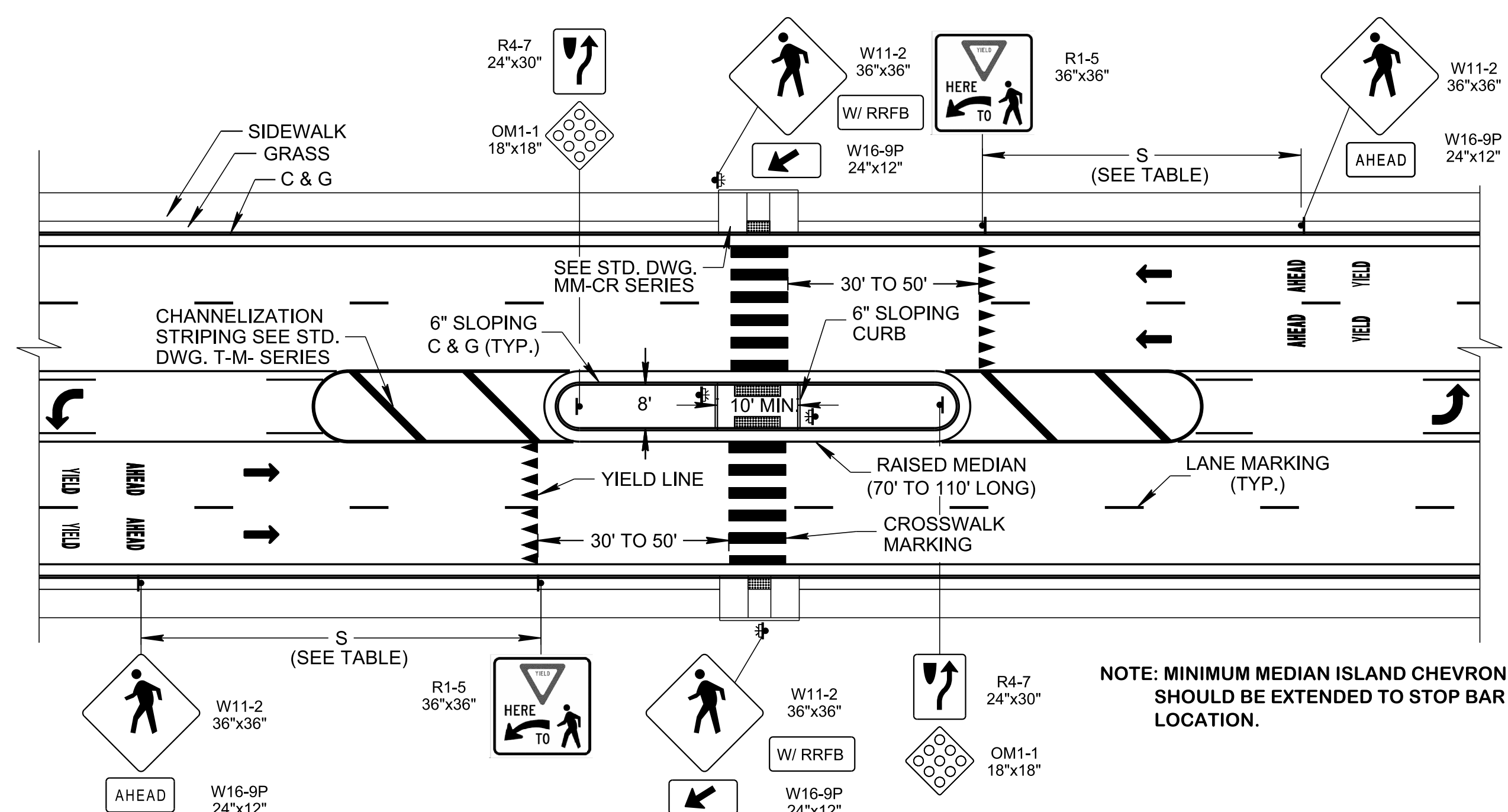
- GENERAL NOTES**
- (A) CONCRETE BARRIER WALL SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 711 AND/OR CURRENT SPECIAL PROVISIONS. MINIMUM INSTALLATION REQUIREMENT OF WALL SECTION IS 60'.
 - (B) IF SAWED CONTRACTION JOINTS ARE USED, THE JOINTS MUST BE SAWED WITHIN FOUR (4) HOURS AFTER THE CONCRETE IS PLACED.
 - (C) THE CONTRACTION JOINTS ARE TO BE SPACED AT 20 TO 25 FOOT INTERVALS WHEN CONSTRUCTED ON ASPHALT PAVEMENT. WHEN THE CONCRETE BARRIER WALL IS ATTACHED TO CONCRETE PAVEMENT THE CONTRACTION JOINTS WILL CORRESPOND TO THE JOINTS IN THE CONCRETE PAVEMENT. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.
 - (D) THE CONCRETE BARRIER WALL SHALL BE GIVEN AN APPLIED TEXTURE FINISH. THE COLOR OF THE FINISH SHALL BE WHITE, FEDERAL SPECIFICATION NO. 37886. THE COST OF MATERIALS AND LABOR FOR THE TEXTURE FINISH SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.
 - (E) THE TWO (2) INCH OPEN EXPANSION JOINTS SHALL BE PLACED AT A MAXIMUM SPACING NOT TO EXCEED 300 FEET. IF FIXED OBJECTS SUCH AS BRIDGE PIERS, BRIDGE ENDS, OVERHEAD SIGN SUPPORTS, OR OTHER FEATURES PROJECTING THROUGH, INTO OR AGAINST THE BARRIER EXIST THAT REQUIRE TWO INCH EXPANSION JOINTS, THEN THE DISTANCE BETWEEN THE EXPANSION JOINTS IS TO BE REDUCED IN ORDER TO ALLOW AN EQUAL DISTANCE BETWEEN JOINTS THAT IS LESS THAN 300 FEET. ALL ADDITIONAL STEEL REQUIRED AT EXPANSION JOINTS TO BE EPOXY COATED REINFORCING STEEL. THE COST OF MATERIAL AND LABOR FOR THE JOINT INSTALLATION SHALL BE INCLUDED IN THE BID PRICE FOR CONCRETE MEDIAN BARRIER.
 - (F) CHAMFER TOP AND END EDGES 3/4 INCH.
 - (G) BAR SPLICES FOR ROADWAY BARRIER SHALL BE A MINIMUM OF 24 TIMES THE NOMINAL DIAMETER OF THE BAR.
 - (H) ANY METHOD DEvised BY THE CONTRACTOR AND APPROVED BY THE ENGINEER THAT WILL ASSURE THE LONGITUDINAL ROADWAY REINFORCING STEEL WILL BE FIXED AGAINST MOVEMENT AND POSITIONED ± 1/2 INCH AS DIMENSIONED WHEN TIED TO THE TRANSVERSE ROADWAY REINFORCING STEEL WILL BE SATISFACTORY.
 - (I) PAYMENT WILL BE MADE UNDER ITEM NO. 711-05.78, GRADE SEPARATED SINGLE SLOPE MEDIAN WALL PER LINEAR FOOT.
 - (J) MIN. SAFETY PERFORMANCE OF 112.5" SINGLE SLOPE WALL IS ACCEPTABLE ACCORDING TO THE TL-4 EVALUATION CRITERIA SPECIFIED IN MASH AS REPORT 405160-3335.
 - (K) IF GRADE SEPARATION IS LESS THAN 2', USE STANDARD 51" MEDIAN BARRIER (S-SSMB-2)
 - (L) A SINGLE H BAR MAY BE SUBSTITUTED FOR THE TWO A400 BARS AS SHOWN.
 - (M) REFER TO STANDARD DRAWING T-M-18 FOR MEDIAN BARRIER DELINEATOR DETAILS AND NOTES. THE COST OF FURNISHING AND INSTALLING MEDIAN BARRIER DELINEATORS SHALL BE INCLUDED WITH THE BID PRICE FOR CONCRETE MEDIAN BARRIERS.

REV. 7-16-13: ADDED NOTES (K) AND (L) AND ADDED ALTERNATIVE.
REV. 05-01-20: REDREW SHEET.
REV. 06-15-21: REVISED SECTIONS AND REDREW THE REINFORCEMENT DETAIL. REMOVED DELINEATOR MOUNTING DETAIL AND NOTES. ADDED PLAN AND GENERAL NOTE (M). REVISED GENERAL NOTE (A)

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SINGLE SLOPE BARRIER WALL FOR GRADE SEPARATED MEDIAN

02-04-2013 S-SSMB-9

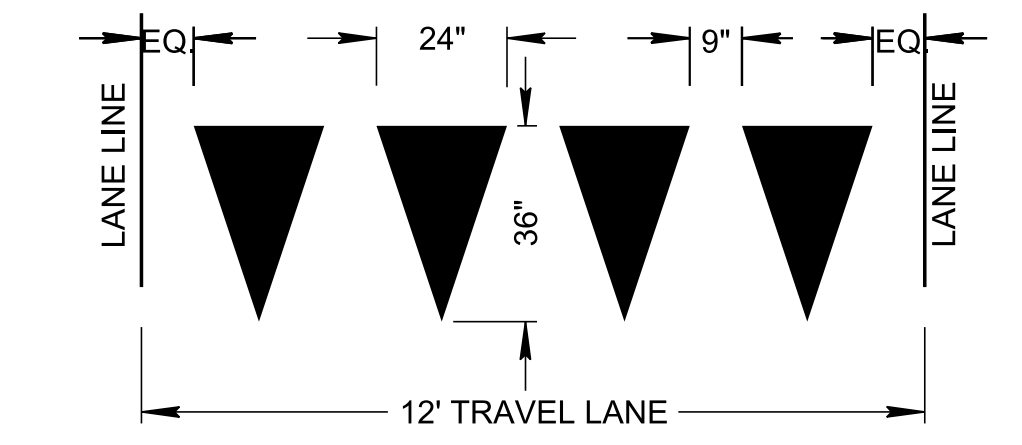


**5 LANES WITH RECTANGULAR RAPID FLASHING BEACON
MID-BLOCK CROSSING**

MINIMUM ADVANCE PLACEMENT OF PEDESTRIAN WARNING SIGNS	
POSTED SPEED	WARNING SIGNS MINIMUM ADVANCE PLACEMENT DISTANCE - S
≤ 35 MPH	100 FT
40 MPH	125 FT

LEGEND	
	GROUND MOUNT SIGN
	COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH PUSH BUTTON AND SIGN
	DETECTABLE WARNING SURFACE

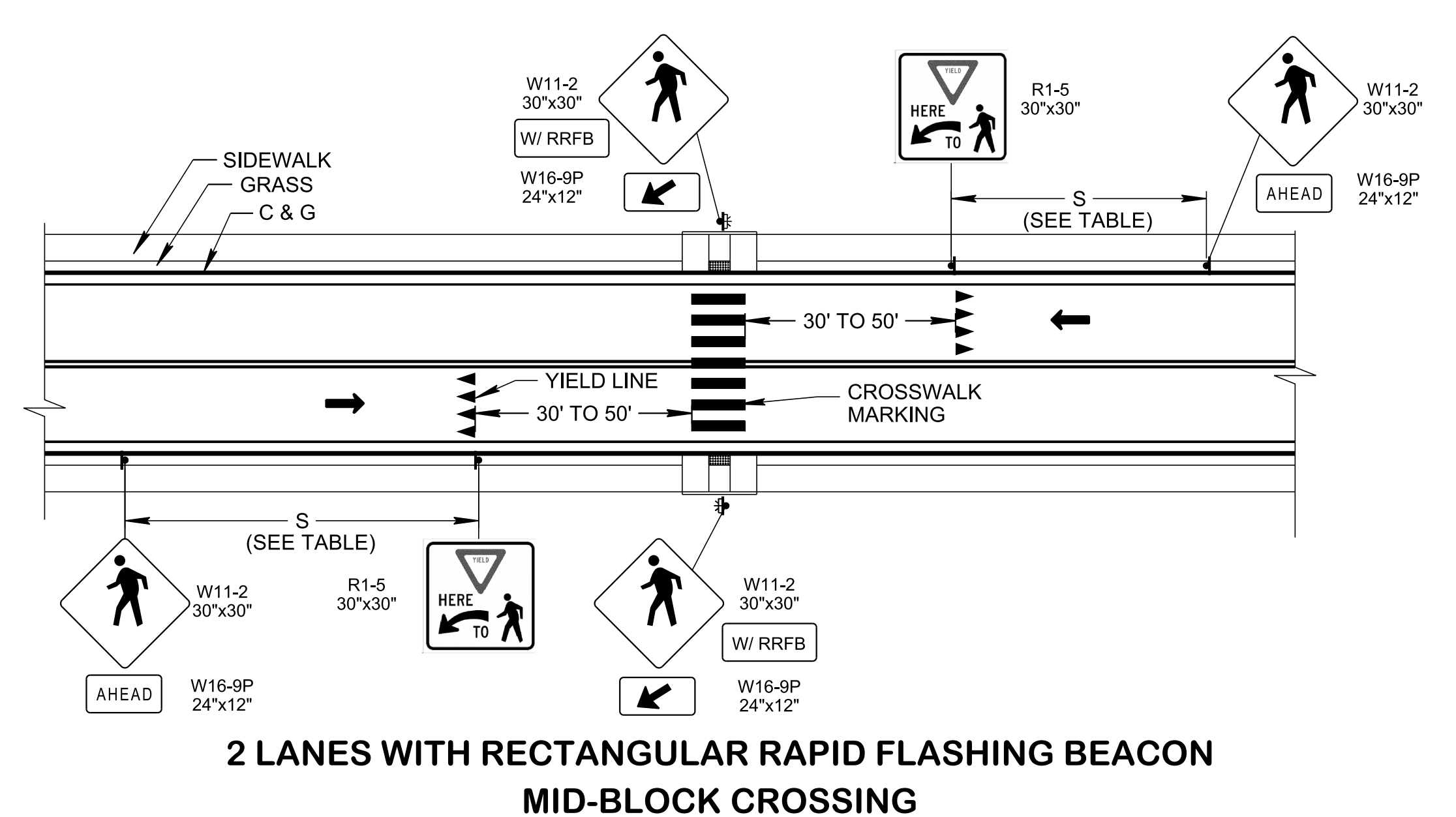
NOTE: WHERE THE SPEED LIMIT EXCEEDS 40 MPH, MARKED CROSSWALKS ALONE SHOULD NOT BE USED AT UNSIGNALIZED (NO SIGNAL) LOCATIONS.



RECOMMENDED YIELD LINE LAYOUTS

NOTES: YIELD LINES MAY BE SMALLER THAN SUGGESTED WHEN INSTALLED ON MUCH NARROWER, SLOW SPEED FACILITIES SUCH AS SHARED -USE PATHS.

AREA OF EACH TRIANGLE A BASE OF 24 INCHES AND A HEIGHT OF 36 INCHES IS = 3 SF.

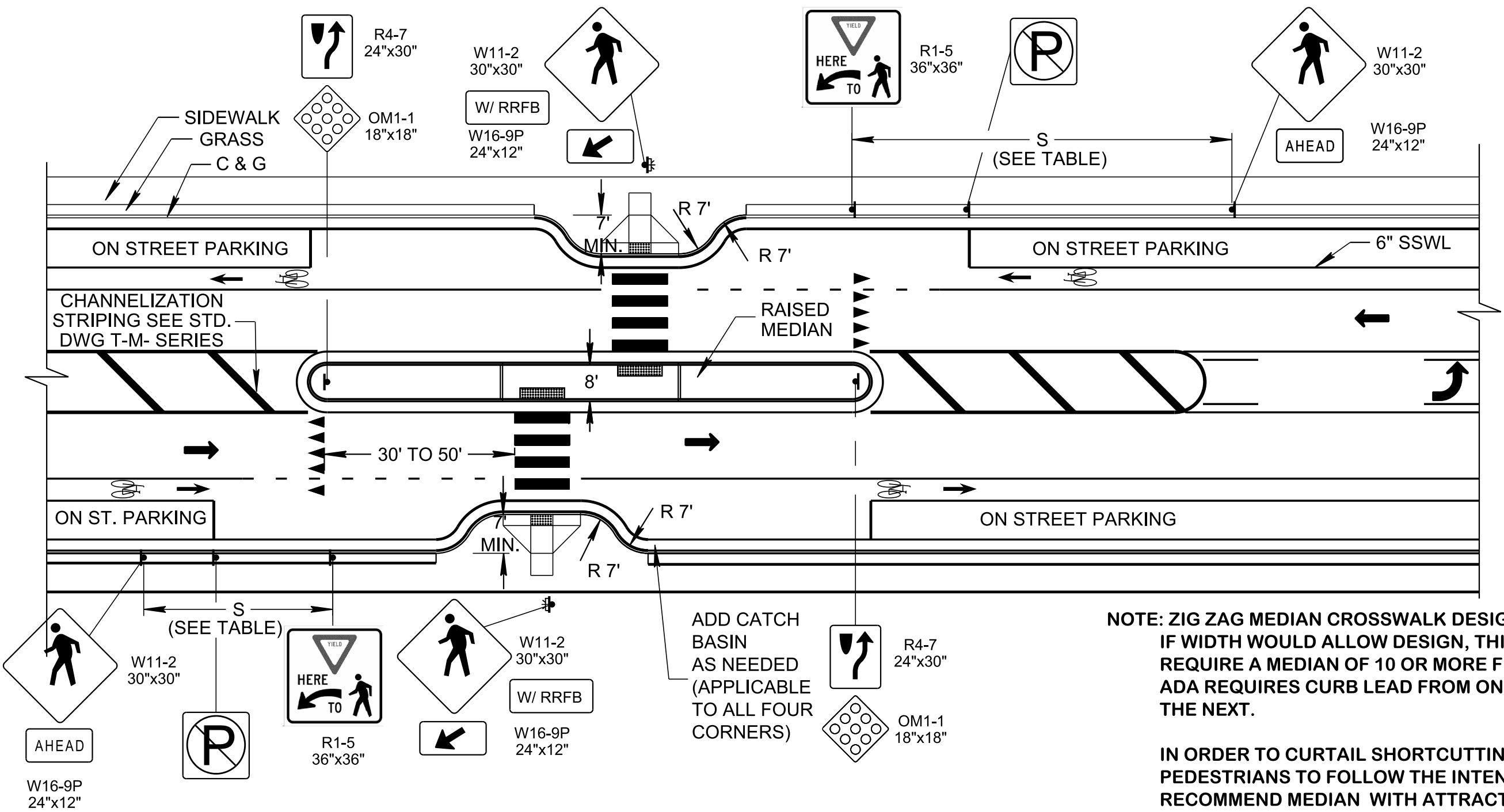


**2 LANES WITH RECTANGULAR RAPID FLASHING BEACON
MID-BLOCK CROSSING**

GENERAL NOTES

- (A) DETAILS SHOWN ON THIS STANDARD DRAWING APPLY TO THE CONSTRUCTION OR RECONSTRUCTION OF MID-BLOCK CROSSINGS AND MODIFICATION OF STREETS, CURBS, OR SIDEWALKS ASSOCIATED WITH IT. SEE TDOT-RDG FOR ADDITIONAL INFORMATION FOR SITE SELECTION, NEW CONSTRUCTION OR RECONSTRUCTION DURING PEDESTRIAN SAFETY INITIATIVE, SPOT SAFETY IMPROVEMENTS AT LOCATIONS MAX 45 MPH. OTHER LOCATIONS WILL NEED SITE SPECIFIC ANALYSIS.
- (B) FOR NEW CONSTRUCTION A TRAFFIC ENGINEERING STUDY WILL HAVE TO BE CONDUCTED TO DETERMINE IF A MID-BLOCK CROSSING IS WARRANTED. MID-BLOCK CROSSINGS SHALL BE INSTALLED DURING RECONSTRUCTION PROJECTS AND REPAVING PROJECTS AT LOCATIONS WHERE EXISTING PEDESTRIAN SAFETY IS A CONCERN.
- (C) PEDESTRIAN IN CROSSWALK SIGNS (W11-2) SHALL BE INSTALLED AT EACH END OF THE CROSSWALK LOCATION. THE SIGNS SHALL BE PLACED IN ADVANCE OF THE CROSSWALK ADJACENT TO THE TRAVEL LANE AND FACING THE DRIVER. REFER TO THE MUTCD ADDITIONAL FOR WARNING SIGNS, TYPE AND LOCATION.
- (D) FOR CURB RAMPS, THE DETECTABLE WARNING SURFACE, PAVEMENT MARKINGS, AND CROSSWALK MARKING DETAILS, SEE STD. DWG. SERIES MM-CR AND MM-PM RESPECTIVELY. FOR MARKING STANDARDS AND CONCRETE CURB AND GUTTER SEE STD. DWG T-M- SERIES AND RP-VC SERIES RESPECTIVELY.
- (E) SEE TDOT TRAFFIC DESIGN MANUAL FOR PEDESTRIAN SIGNAL PUSH BUTTONS.
- (F) YIELD LINES SHOULD BE PLACED AT A SUFFICIENT DISTANCE (30' TO 50') FROM THE CROSSWALK TO ENSURE VISIBILITY IS PROVIDED FOR BOTH MOTORISTS AND PEDESTRIANS. YIELD LINES SHALL CONSIST OF A ROW OF SOLID WHITE ISOSCELES TRIANGLES POINTING TOWARD APPROACHING VEHICLES EXTENDING ACROSS APPROACH LANES TO INDICATE THE POINT AT WHICH THE YIELD IS INTENDED OR REQUIRED TO BE MADE. YIELD LINES CONSIST OF WHITE TRIANGLES WHICH FACE TRAFFIC. WHEN A BIKE LANE IS PRESENT, ADD ONE ADDITIONAL TRIANGLE IN THE CENTER OF BIKE LANE.
- (G) IF YIELD LINES ARE USED AT A CROSSWALK THAT CROSSES AT AN UNCONTROLLED MULTI-LANE APPROACH, YIELD HERE FOR PEDESTRIANS (R1-5 SERIES) SIGNS SHALL BE USED.
- (H) A DEVICE THAT MAY BE USED TO ASSIST PEDESTRIANS CROSSING IN A MARKED CROSSWALK AT AN UNSIGNALIZED INTERSECTION IS A RECTANGULAR RAPID FLASHING BEACON (RRFB). RRFB'S ARE PARTICULARLY EFFECTIVE AT MULTILANE CROSSINGS WITH SPEED LIMITS LESS THAN 40 MPH. CONSIDER THE PEDESTRIAN HYBRID BEACON (PHB) INSTEAD OF RRFB'S FOR ROADWAYS SPEED LIMITS ARE EQUAL TO OR GREATER THAN 40 MPH.
- (I) A MEDIAN SHOULD BE AT LEAST 8.0 FEET WIDE TO ALLOW THE PEDESTRIAN TO WAIT COMFORTABLY IN THE CENTER. IF THE DESIRED 8 FEET CANNOT BE ACHIEVED, USE A MINIMUM WIDTH OF 6 FEET. THE PEDESTRIAN CROSSWALK MEDIAN ISLAND ARE ADA-APPROVED RAMPS (1:12 GRADE) SHOULD BE USED. IT IS BEST TO PROVIDE A SLIGHT GRADE 2 PERCENT TO PERMIT WATER AND SILT TO DRAIN FROM THE AREA. DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS. INSTALL CATCH BASINS ON UPSTREAM SIDE OF RAMP FOR ROADS WITH GRADES LESS THAN 2%.
- (J) PARKING AND OTHER SIGHT OBSTRUCTIONS SHOULD BE PROHIBITED FOR AT LEAST 100 FEET IN ADVANCE OF AND AT LEAST 20 FEET BEYOND THE MARKED CROSSWALK, OR SITE ACCOMMODATIONS SHOULD BE MADE THROUGH CURB EXTENSIONS OR OTHER TECHNIQUES TO PROVIDE ADEQUATE SIGHT DISTANCE. THE INSTALLATION SHOULD INCLUDE SUITABLE STANDARD SIGNS AND PAVEMENT MARKINGS.
- (K) STREETLIGHTS SHOULD BE INSTALLED AT THE CROSSWALK ON BOTH SIDES ROAD TO IMPROVE PEDESTRIAN COMFORT, SECURITY, AND SAFETY DURING DARK AND BAD WEATHER CONDITIONS. FLUORESCENT YELLOW- GREEN SIGNS PROVIDE SUPERIOR VISIBILITY AND ARE EASILY NOTICEABLE IN DAYLIGHT AND DARK CONDITIONS. USE FLUORESCENT YELLOW- GREEN SIGNS FOR PEDESTRIAN AND BICYCLE WARNING TO HELP KEEP PEDESTRIANS AND DRIVERS SAFE.
- (L) MIDBLOCK CROSSWALKS SHOULD BE LOCATED AT LEAST 100 FEET FROM THE NEAREST SIDE STREET OR DRIVEWAY SO THAT DRIVERS TURNING ONTO THE MAJOR STREET HAVE A CHANCE TO NOTICE PEDESTRIANS AND PROPERLY YIELD TO PEDESTRIANS WHO ARE CROSSING THE STREET.
- (M) ADD CHANNELIZING DEVICES AT MID-BLOCK PEDESTRIAN CROSSINGS IN CONJUNCTION WITH IN STREET PEDESTRIAN CROSSING (R1-6 SERIES) SIGNS AS NEEDED.
- (N) PAYMENT

702-01,	CONCRETE CURB,	PER C.Y.,
702-03,	CONCRETE COMBINED CURB AND GUTTER,	PER C.Y.,
713-15.40,	SIGN INSTALLATION (DESCRIPTION),	PER LS,
716-02.03	PLASTIC PAVEMENT MARKING (CROSS-WALK),	PER L.F.,
716-02.04,	PLASTIC PAVEMENT MARKING (CHANNELIZATION STRIPING),	PER S.Y.,
716-02.05,	PLASTIC PAVEMENT MARKING (STOP LINE),	PER L.F.,
716-04.12,	PLASTIC PAVEMENT MARKING (YIELD LINE),	PER S.F.,
730-26.07,	FLASHING WARNING BEACON (DESCRIPTION),	PER EACH.



**2 LANES WITH RECTANGULAR RAPID FLASHING BEACON
ALT. MID-BLOCK CROSSING**

NOTE: ZIG ZAG MEDIAN CROSSWALK DESIGN ONLY ALLOWED IF WIDTH WOULD ALLOW DESIGN, THIS MAY REQUIRE A MEDIAN OF 10 OR MORE FEET WIDE. ADA REQUIRES CURB LEAD FROM ONE RAMP TO THE NEXT.

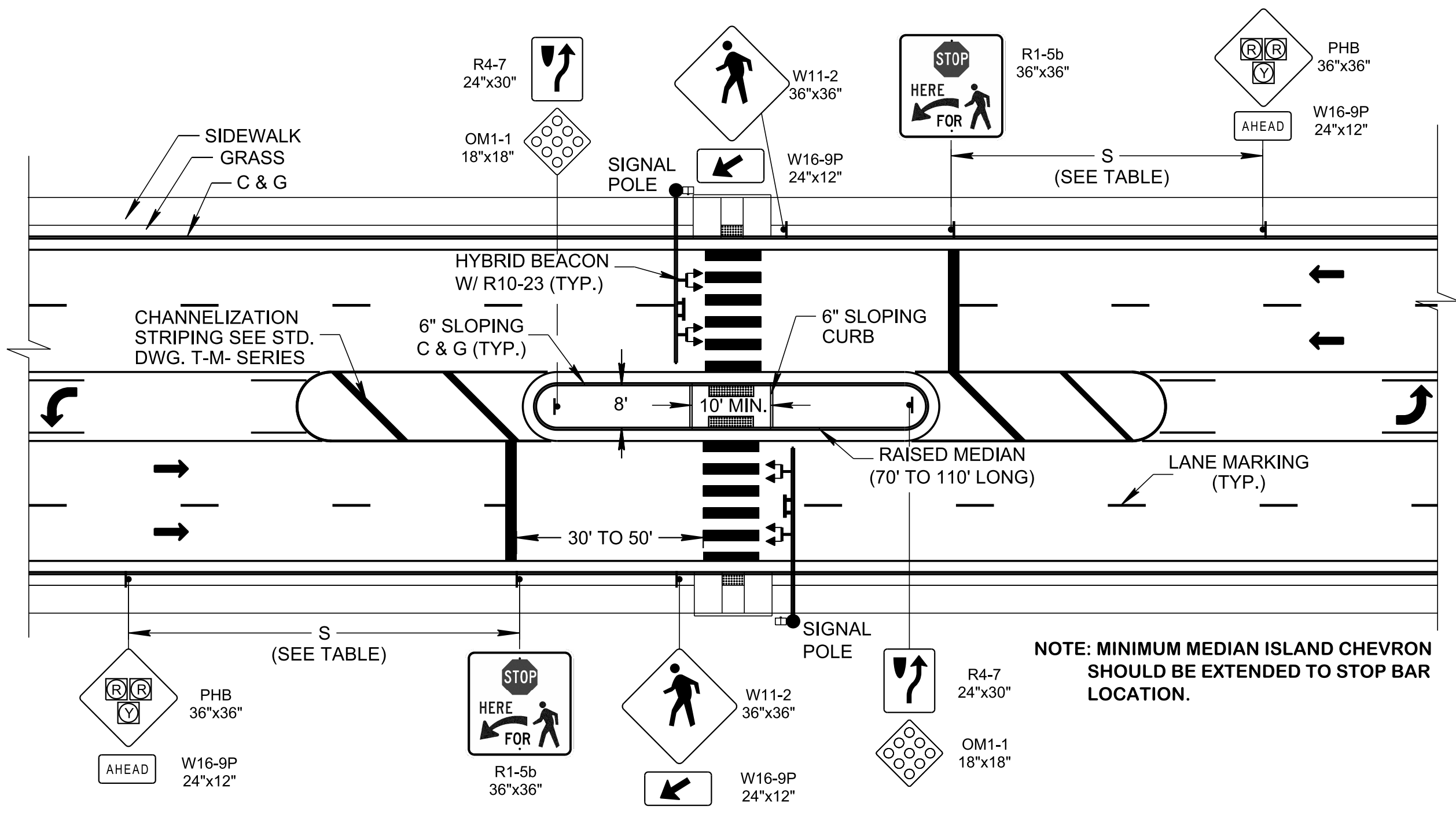
IN ORDER TO CURTAIL SHORTCUTTING AND FORCE PEDESTRIANS TO FOLLOW THE INTENDED PATH, RECOMMEND MEDIAN WITH ATTRACTIVE FENCING TO CORRAL PEDESTRIANS IN THE CORRECT DIRECTION.

REV. 07-17-20: REMOVED RIGHT TURN ARROWS FROM THE MIDDLE LANE.
REV. 11-30-20: REVISED CROSSWALK SIGN ON GENERAL NOTE (C). ADDED GENERAL NOTE (M)
REV. 06-15-21: REVISED GENERAL NOTE (E)

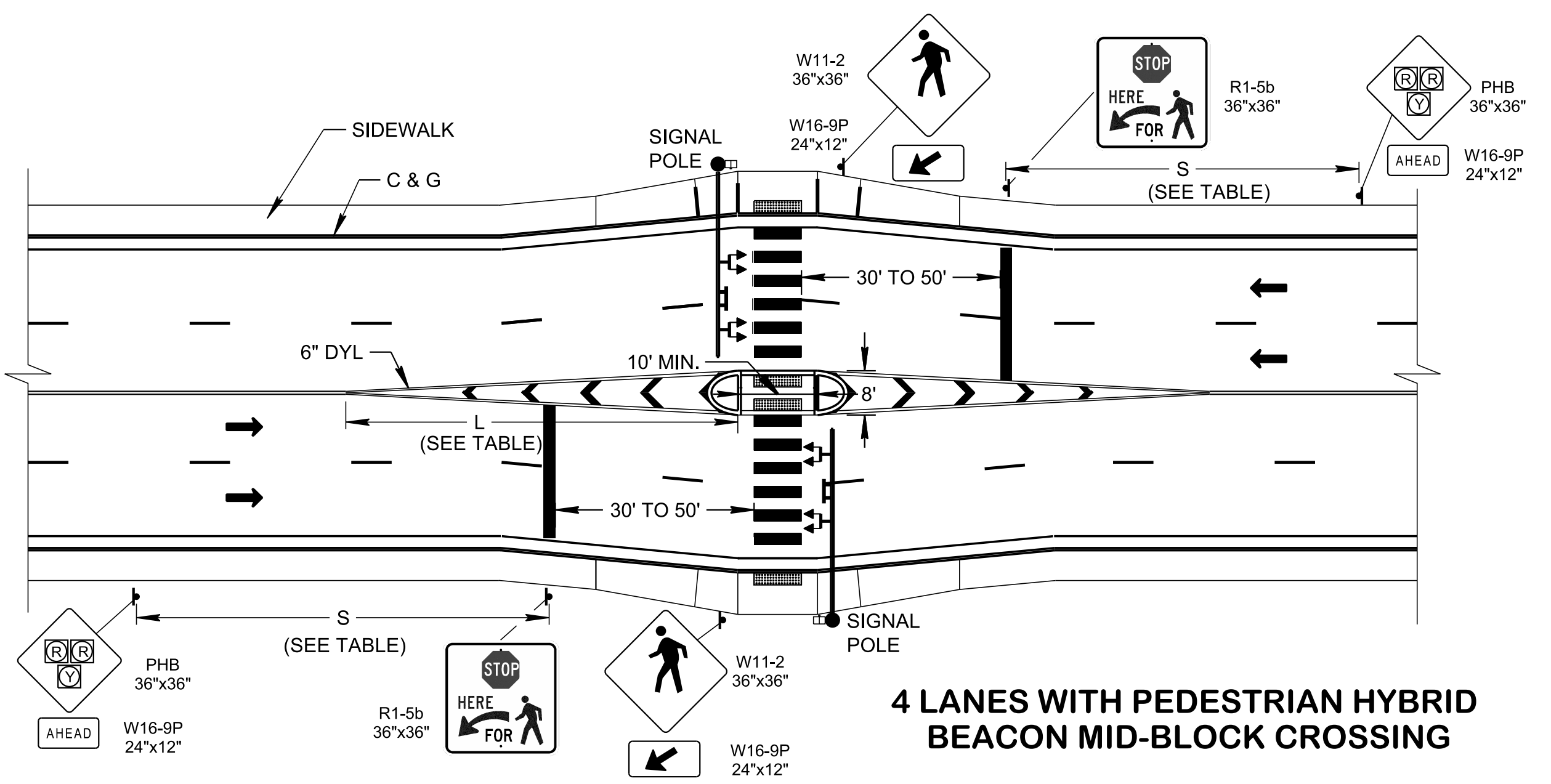
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

STANDARD
UNSIGNALIZED
MID-BLOCK CROSSING

04-08-2020 T-M-4A



5 LANES WITH PEDESTRIAN HYBRID BEACON MID-BLOCK CROSSING



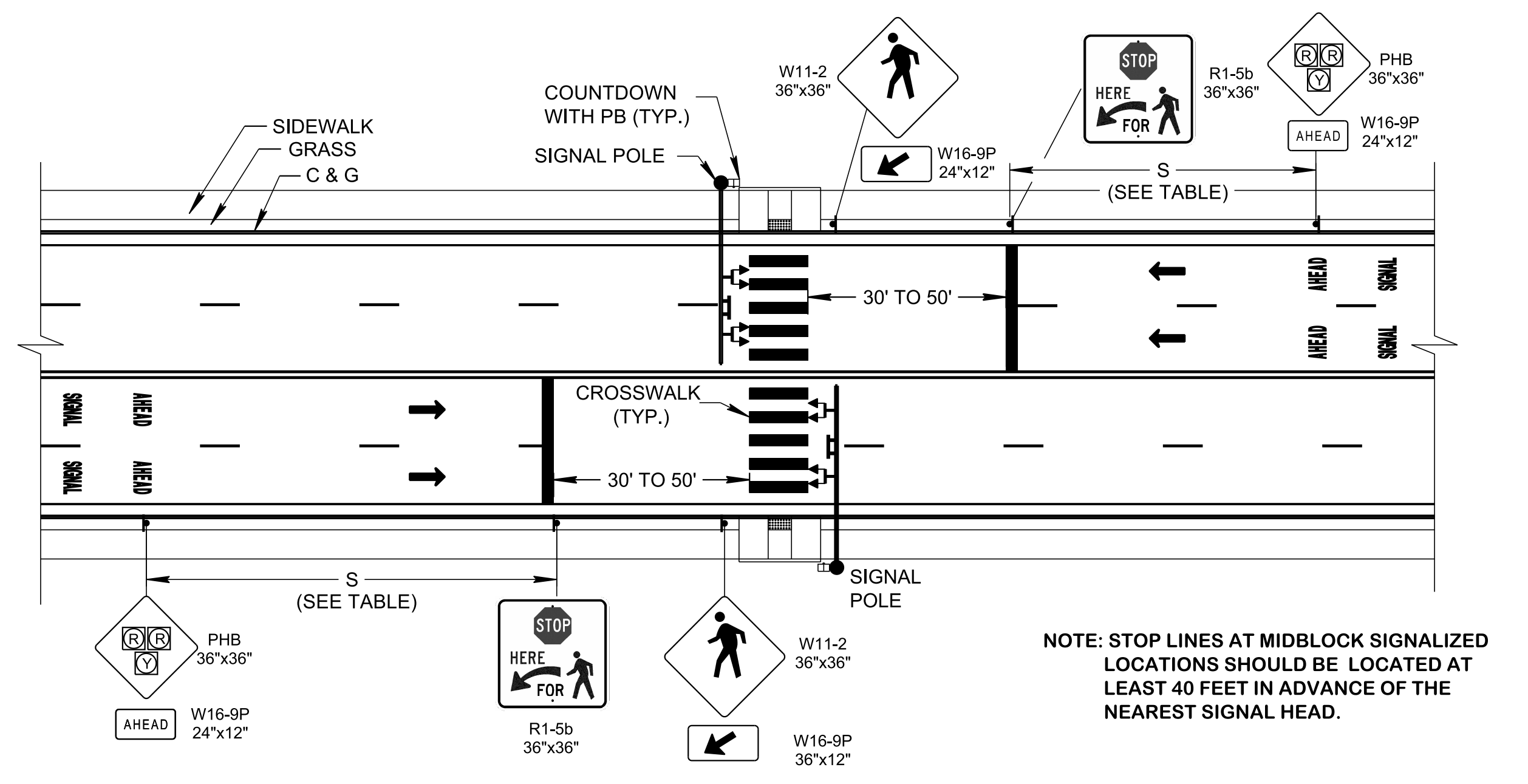
4 LANES WITH PEDESTRIAN HYBRID BEACON MID-BLOCK CROSSING

MINIMUM ADVANCE PLACEMENT OF PEDESTRIAN WARNING SIGNS	
POSTED SPEED	WARNING SIGNS MINIMUM ADVANCE PLACEMENT DISTANCE - S
≤ 35 MPH	100 FT
40 MPH	125 FT
45 MPH	175 FT

THE APPROPRIATE TAPER LENGTH (L)	
$L = \frac{WS^2}{60}$	40 MPH OR LESS
$L = WS$	45 MPH OR MORE

WHERE:
 L = TAPER LENGTH IN FEET
 W = WIDTH OF OFFSET IN FEET
 S = POSTED SPEED

LEGEND	
	PEDESTRIAN HYBRID BEACON
	GROUND MOUNT SIGN
	MAST ARM SIGNAL POLE
	COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH PUSH BUTTON AND SIGN
	DETECTABLE WARNING SURFACE



4 LANES WITH PEDESTRIAN HYBRID BEACON MID-BLOCK CROSSING

NOTE: STOP LINES AT MIDBLOCK SIGNALIZED LOCATIONS SHOULD BE LOCATED AT LEAST 40 FEET IN ADVANCE OF THE NEAREST SIGNAL HEAD.

- ### GENERAL NOTES
- (A) DETAILS SHOWN ON THIS STANDARD DRAWING APPLY TO THE CONSTRUCTION OR RECONSTRUCTION OF MID-BLOCK CROSSINGS AND MODIFICATION OF STREETS, CURBS, OR SIDEWALKS ASSOCIATED WITH IT. SEE TDOT-RDG FOR ADDITIONAL INFORMATION FOR SITE SELECTION, NEW CONSTRUCTION OR RECONSTRUCTION DURING PEDESTRIAN SAFETY INITIATIVE, SPOT SAFETY IMPROVEMENTS AT LOCATIONS MAX 45 MPH. OTHER LOCATIONS WILL NEED SITE SPECIFIC ANALYSIS.
 - (B) FOR NEW CONSTRUCTION A TRAFFIC ENGINEERING STUDY WILL HAVE TO BE CONDUCTED TO DETERMINE IF A MID-BLOCK CROSSING IS WARRANTED. MID-BLOCK CROSSINGS SHALL BE INSTALLED DURING RECONSTRUCTION PROJECTS AND REPAVING PROJECTS AT LOCATIONS WHERE EXISTING PEDESTRIAN SAFETY IS A CONCERN.
 - (C) PEDESTRIAN IN CROSSWALK SIGNS (W11-2) SHALL BE INSTALLED AT EACH END OF THE CROSSWALK LOCATION. THE SIGNS SHALL BE PLACED IN ADVANCE OF THE CROSSWALK ADJACENT TO THE TRAVEL LANE AND FACING THE DRIVER. REFER TO THE MUTCD FOR ADDITIONAL WARNING SIGNS, TYPE AND LOCATION.
 - (D) FOR CURB RAMPS, THE DETECTABLE WARNING SURFACE, PAVEMENT MARKINGS, AND CROSSWALK MARKING DETAILS, SEE STD. DWG. SERIES MM-CR AND MM-PM RESPECTIVELY. FOR MARKING STANDARDS AND CONCRETE CURB AND GUTTER SEE STD. DWG T-M- SERIES AND RP-VC SERIES RESPECTIVELY.
 - (E) FOR PEDESTRIAN SIGNAL PUSH BUTTONS, I.E HAWK, SEE TDOT TRAFFIC DESIGN MANUAL. IF THE PEDESTRIAN CLEARANCE TIME IS SUFFICIENT ONLY TO CROSS FROM THE CURB OR SHOULDER TO A MEDIAN OF SUFFICIENT WIDTH FOR PEDESTRIANS TO WAIT AND THE SIGNALS ARE PEDESTRIAN ACTUATED, AN ADDITIONAL PEDESTRIAN DETECTOR SHALL BE PROVIDED IN THE MEDIAN.
 - (F) STOP LINES SHOULD BE PLACED AT A SUFFICIENT DISTANCE (30' TO 50') FROM THE CROSSWALK TO ENSURE VISIBILITY IS PROVIDED FOR BOTH MOTORISTS AND PEDESTRIANS. STOP LINES AT MID-BLOCK SIGNALIZED LOCATIONS SHOULD BE PLACED AT LEAST 40 FEET IN ADVANCE OF THE NEAREST SIGNAL INDICATION.
 - (G) STOP LINES SHALL CONSIST OF SOLID WHITE LINES EXTENDING ACROSS APPROACH LINES TO INDICATE THE POINT AT WHICH THE STOP IS INTENDED OR REQUIRED TO BE MADE. IF STOP LINES ARE USED AT A CROSSWALK THAT CROSSES AT AN UNCONTROLLED MULTI-LANE APPROACH, STOP HERE FOR PEDESTRIANS (R1-5 SERIES) SIGNS SHALL BE USED.
 - (H) THE PLACEMENT OF MID-BLOCK SIGNALS. THE PRIMARY SIGNALIZED TREATMENT THAT SHOULD BE CONSIDERED AT MID-BLOCK OR NON-INTERSECTION CROSSINGS IS THE HIGH INTENSITY ACTIVATED CROSSWALK (HAWK) PEDESTRIAN HYBRID BEACON (PHB). A HAWK PEDESTRIAN HYBRID BEACON SHOULD BE EXAMINED WHERE THE PPH EXCEEDS 20 AND MOTOR VEHICULAR SPEEDS EXCEED 35 MPH.
 - (I) RECTANGULAR RAPID FLASHING BEACON (RRFB) MAYBE USED AS AN ALTERNATIVE TO ASSIST PEDESTRIANS CROSSING IN A MARKED CROSSWALK AT AN UNSIGNALIZED INTERSECTION WITH SPEED LIMITS LESS THAN 40 MPH. SEE STANDARD DRAWING T-M-4A FOR UNSIGNALIZED MID-BLOCK CROSSING.
 - (J) A MEDIAN SHOULD BE AT LEAST 8.0 FEET WIDE TO ALLOW THE PEDESTRIAN TO WAIT COMFORTABLY IN THE CENTER, IF THE DESIRED 8 FEET CANNOT BE ACHIEVED, USE A MINIMUM WIDTH OF 6 FEET. THE PEDESTRIAN CROSSWALK MEDIAN ISLAND ARE ADA-APPROVED RAMPS (1:12 GRADE) SHOULD BE USED. IT IS BEST TO PROVIDE A SLIGHT GRADE 2 PERCENT TO PERMIT WATER AND SILT TO DRAIN FROM THE AREA. DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH RAMPS. INSTALL CATCH BASINS ON UPSTREAM SIDE OF RAMP FOR ROADS WITH GRADES LESS THAN 2%.
 - (K) WHEN A PEDESTRIAN HYBRID BEACON IS USED, A CROSSWALK STOP ON RED (R10-23) SIGN SHALL BE MOUNTED ADJACENT TO A PEDESTRIAN HYBRID BEACON FACE ON EACH MAJOR STREET APPROACH. THE PEDESTRIAN HYBRID BEACON SHOULD BE INSTALLED AT LEAST 100 FEET FROM SIDE STREETS OR DRIVEWAYS THAT ARE CONTROLLED BY STOP OR YIELD SIGNS.
 - (L) PARKING AND OTHER SIGHT OBSTRUCTIONS SHOULD BE PROHIBITED FOR AT LEAST 100 FEET IN ADVANCE OF AND AT LEAST 20 FEET BEYOND THE MARKED CROSSWALK, OR SITE ACCOMMODATIONS SHOULD BE MADE THROUGH CURB EXTENSIONS OR OTHER TECHNIQUES TO PROVIDE ADEQUATE SIGHT DISTANCE. THE INSTALLATION SHOULD INCLUDE SUITABLE STANDARD SIGNS AND PAVEMENT MARKINGS.
 - (M) STREETLIGHTS SHOULD BE INSTALLED AT THE CROSSWALK ON BOTH SIDES ROAD TO IMPROVE PEDESTRIAN COMFORT, SECURITY, AND SAFETY DURING DARK AND BAD WEATHER CONDITIONS. FLUORESCENT YELLOW-GREEN SIGNS PROVIDE SUPERIOR VISIBILITY AND ARE EASILY NOTICEABLE IN DAYLIGHT AND DARK CONDITIONS. USE FLUORESCENT YELLOW-GREEN SIGNS FOR PEDESTRIAN AND BICYCLE WARNING TO HELP KEEP PEDESTRIANS AND DRIVERS SAFE.
 - (N) MID BLOCK CROSSWALKS SHOULD BE LOCATED AT LEAST 100 FEET FROM THE NEAREST SIDE STREET OR DRIVEWAY SO THAT DRIVERS TURNING ONTO THE MAJOR STREET HAVE A CHANCE TO NOTICE PEDESTRIANS AND PROPERLY YIELD TO PEDESTRIANS WHO ARE CROSSING THE STREET.
 - (O) ADD CHANNELIZING DEVICES AT MID-BLOCK PEDESTRIAN CROSSINGS IN CONJUNCTION WITH IN STREET PEDESTRIAN CROSSING (R1-6 SERIES) SIGNS AS NEEDED.
 - (P)

PAYMENT	702-01, 702-03, 713-15.40, 716-02.03, 716-02.04, 716-02.05, 730-26.01,	CONCRETE CURB, CONCRETE COMBINED CURB AND GUTTER, SIGN INSTALLATION (DESCRIPTION), PLASTIC PAVEMENT MARKING (CROSSWALK), PLASTIC PAVEMENT MARKING (CHANNELIZATION STRIPING), PAVEMENT MARKING (STOP LINE), PEDESTRIAN SIGNAL DISPLAY,
		PER C.Y., PER C.Y., PER L.S., PER L.F., PER S.Y., PER L.F., PER EACH.

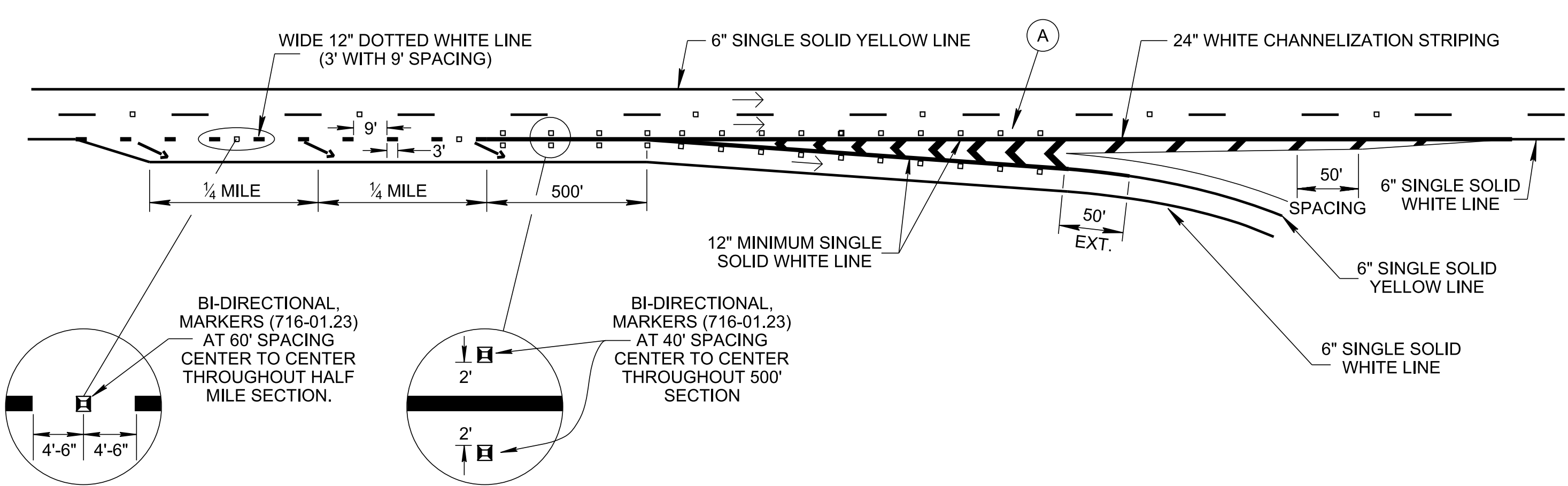
REV. 07-17-20: REMOVED RIGHT TURN ARROWS FROM THE MIDDLE LANE.
 REV. 11-30-20: REVISED CROSSWALK SIGN ON GENERAL NOTE (C). ADDED GENERAL NOTE (P).
 REV. 06-15-21: REVISED GENERAL NOTES (E) AND (I). REMOVED MINIMUM ADVANCE PLACEMENT TABLE NOTE.

STATE OF TENNESSEE
 STANDARD DRAWING
 DEPARTMENT OF TRANSPORTATION

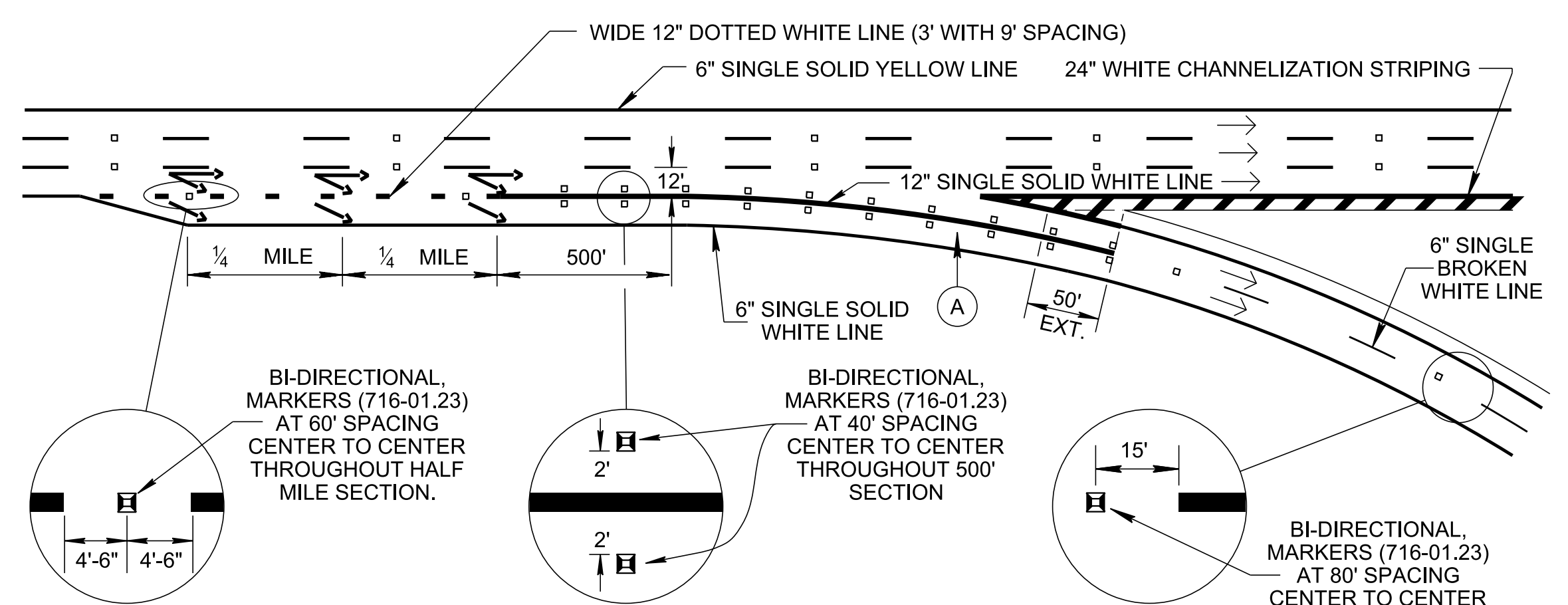
STANDARD SIGNALIZED MID-BLOCK CROSSING

04-08-2020 T-M-4B

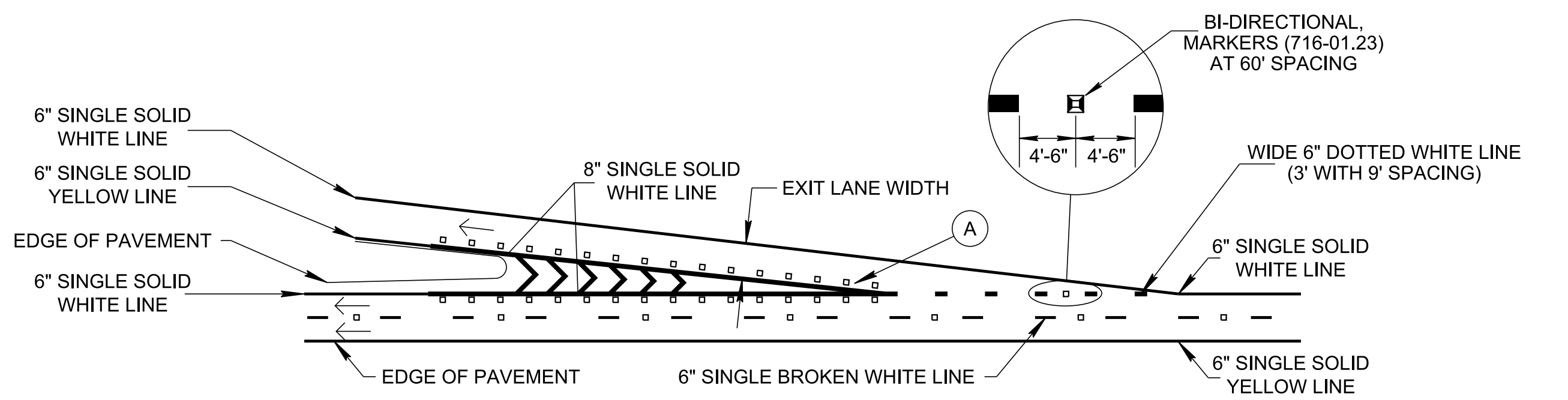
6/16/2021 9:17:32 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings\Standard Roadway Drawings - CURRENT\In Progress\10-107.00 Design - Traffic Control IP\170.01 Pavements Markings IP\T-M-6-20210615.DGN



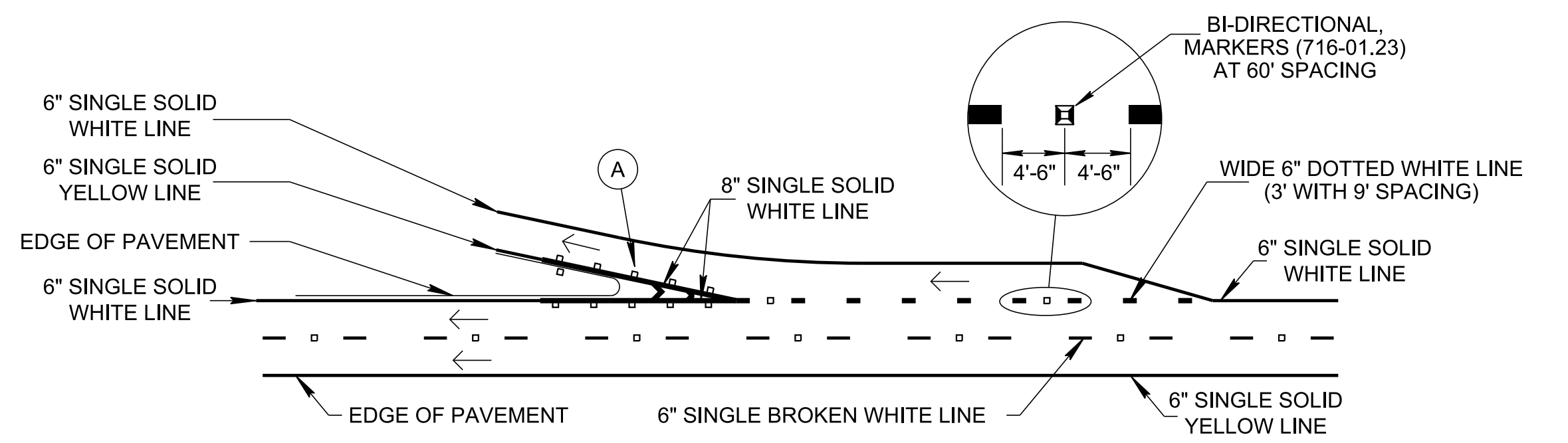
EXIT ONLY LANE



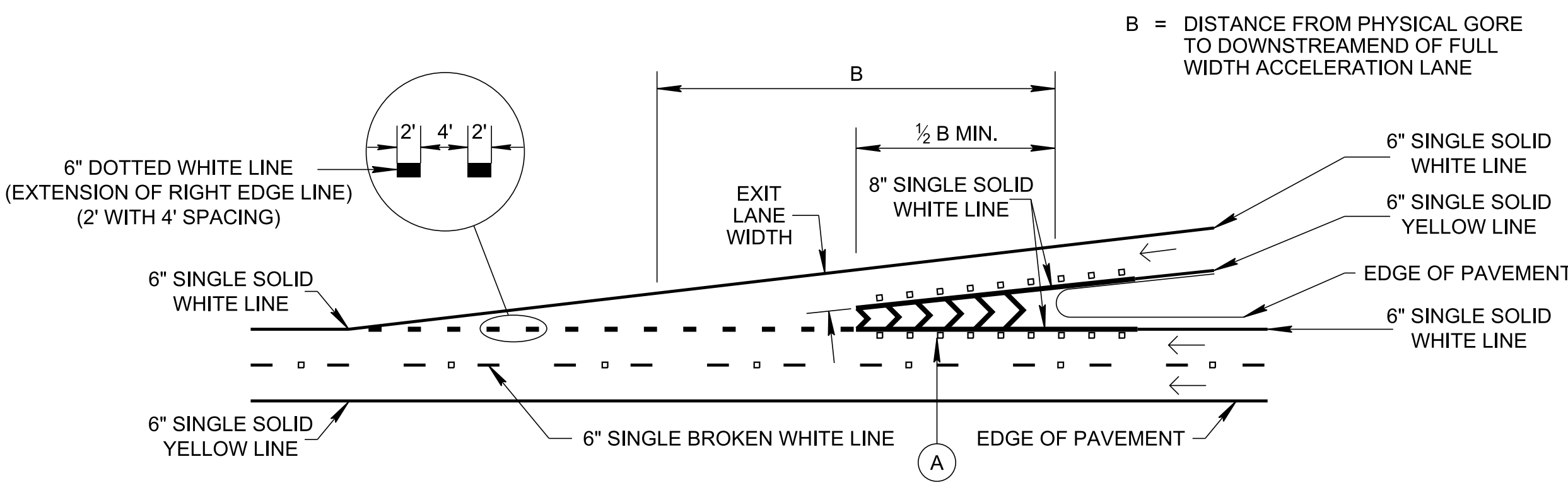
EXIT ONLY LANE WITH OPTIONAL LANE



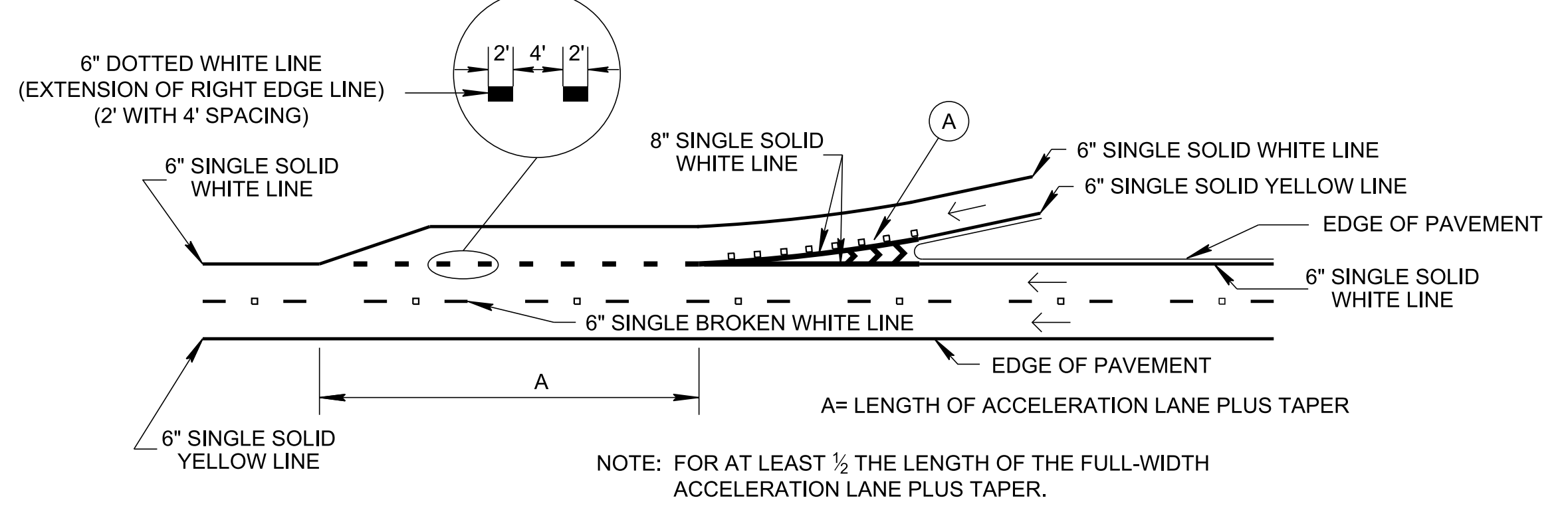
**TAPERED DECELERATION LANE
EXIT RAMP**



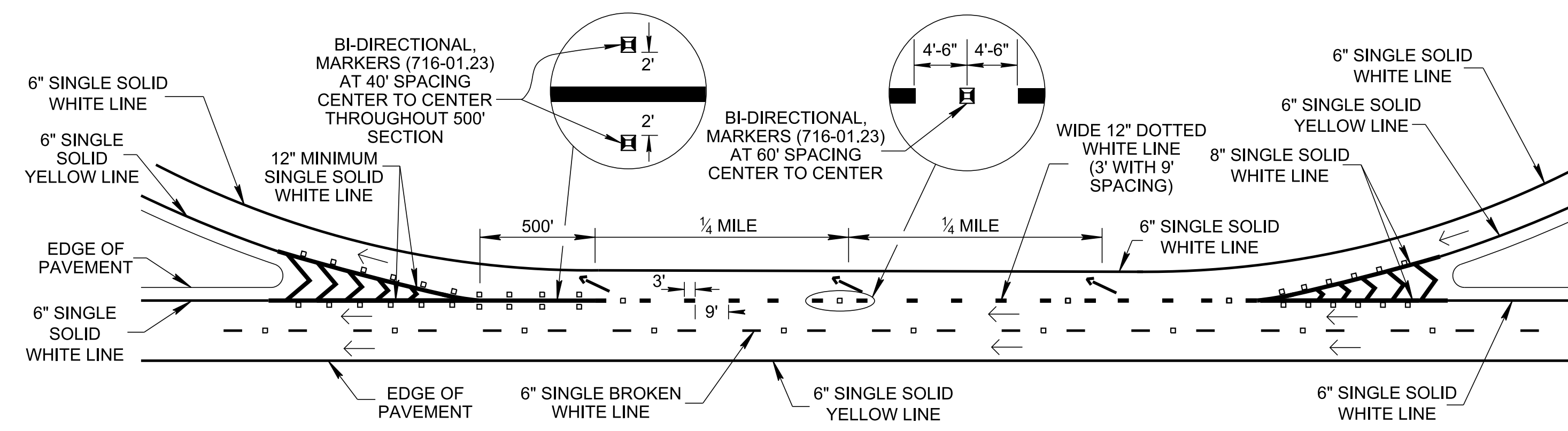
PARALLEL DECELERATION LANE



**TAPERED ACCELERATION LANE
ENTRANCE RAMP**

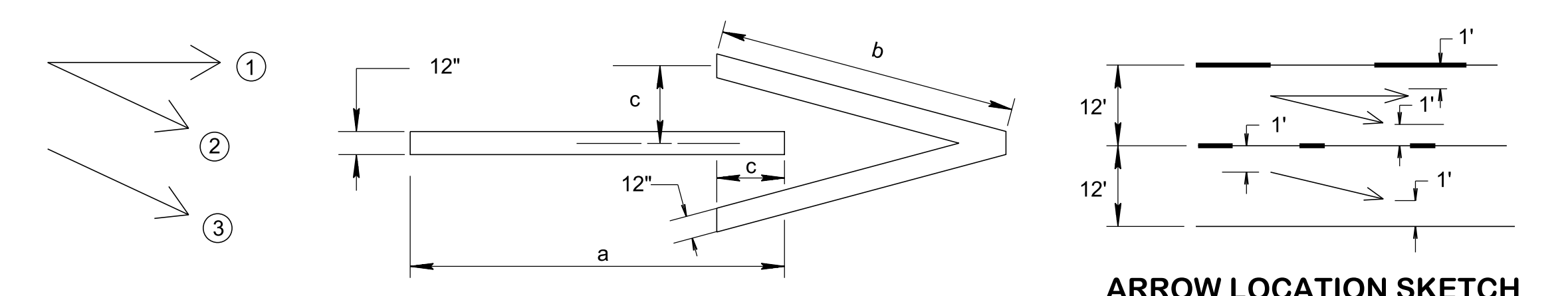


PARALLEL ACCELERATION LANE



AUXILIARY LANE AT CLOSELY SPACED RAMP

NOTE: USE THIS DETAIL WHERE DISTANCE FROM THEORETICAL GORE OF ENTRANCE RAMP TO THEORETICAL GORE OF EXIT RAMP IS LESS THAN OR EQUAL TO 1/4 MILE.



DIMENSIONS			
ARROW	a	b	c
①	14'-0"	8'-6"	2'-2"
②	10'-4"	8'-6"	2'-2"
③	16'-6"	10'-0"	2'-6"

**DETAILS FOR EXIT PAVEMENT ARROWS
AT 1/4 MILE SPACING**

PAY ITEM NOS.:
716-04.01, PLASTIC PAVEMENT MARKING (STRAIGHT-TURN ARROW), EACH
716-04.05, PLASTIC PAVEMENT MARKING (STRAIGHT ARROW), EACH
716-04.07, PLASTIC PAVEMENT MARKING (EXIT ONLY ARROW), EACH

LEGEND
← TRAFFIC FLOW ARROW
↘ PLASTIC PAVEMENT MARKING ARROW

FOOTNOTE

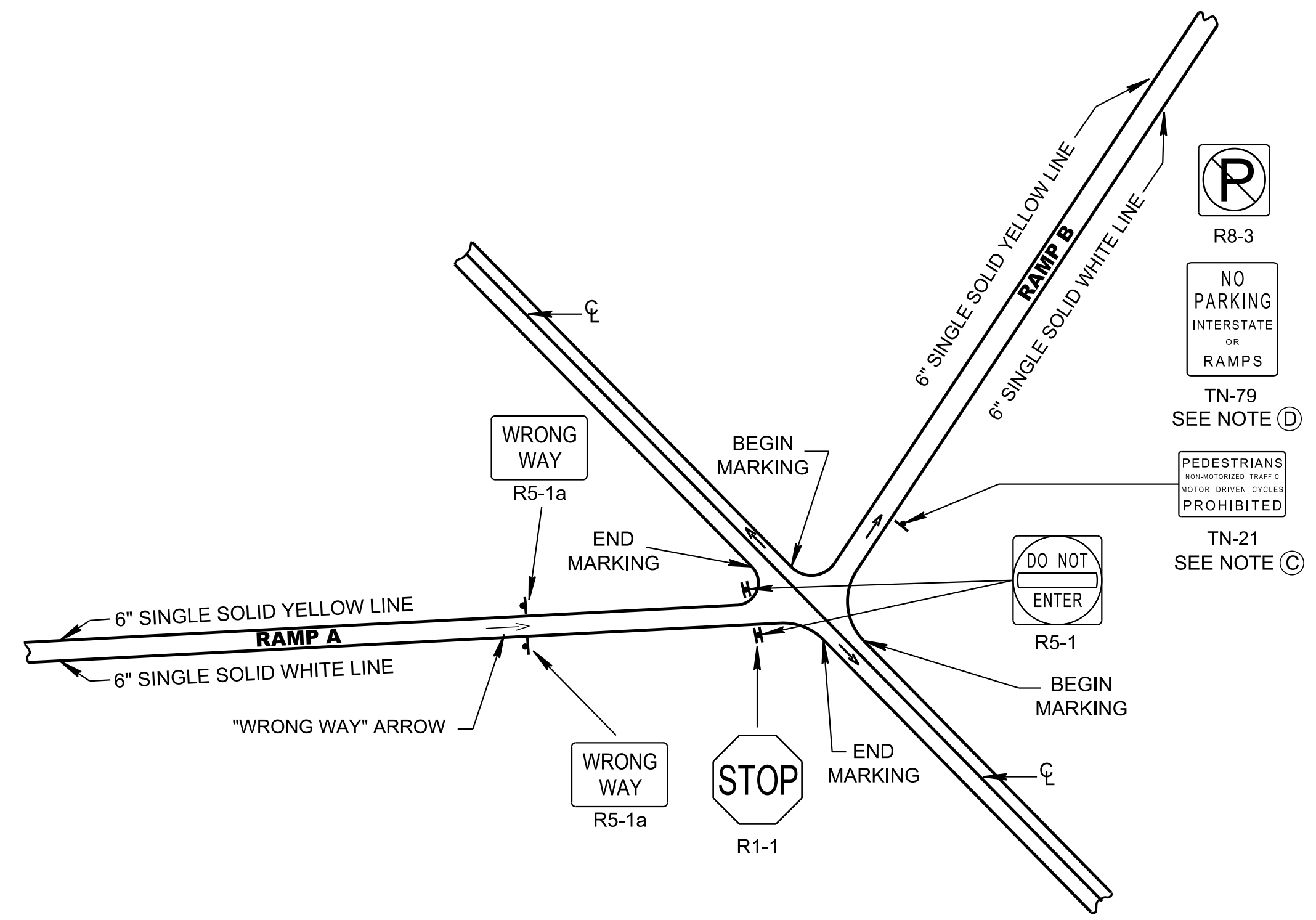
Ⓐ SEE STANDARD DRAWING NO. T-M-7 FOR GORE MARKING DETAILS.

- REV. 2-22-88: ADDED DETAIL FOR "EXIT ONLY" AND FOR PARALLEL ACCELERATION LANE MARKING. CHANGED SHEET TITLE AND DWG. NO. FROM T-M-3 TO T-M-6. ADDED NOTES. ADDED DETAILS FOR TWO LANE EXIT AND PAVEMENT ARROWS. ADDED DOTTED LINES AT EXIT RAMPS.
- REV. 10-30-90: REDREW AND REORGANIZED SHEET, CHANGED WIDTH OF EXIT PAVEMENT ARROWS TO 12".
- REV. 03-20-91: ADDED MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR) TO EXIT ONLY LANE DETAIL AND TWO LANE EXIT WITH OPTIONAL LANE DETAIL. CHANGED GENERAL NOTES. ON REMAINDER OF SHEET CHANGED TYPE 2 PAVEMENT MARKERS (CLEAR) TO MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR).
- REV. 10-26-92: ADDED GENERAL NOTE (B).
- REV. 12-18-92: MOVED MONO-DIRECTIONAL PAVEMENT MARKERS (CLEAR) FROM INSIDE OF CHANNELIZATION MARKING TO OUTSIDE OF CHANNELIZATION MARKING.
- REV. 01-19-94: IN DETAIL FOR TWO LANE EXIT WITH OPTIONAL LANE, EXTEND RAMP AND ADD PAVEMENT MARKERS.
- REV. 07-29-98: CHANGED WIDTH OF CENTERLINES, EDGELINES AND DOTTED WHITE LANE LINES FROM 4 TO 6 INCHES. CHANGED USE OF DOTTED WHITE LANE LINES IN PARALLEL AND TAPERED ACCELERATION AND DECELERATION DETAILS.
- REV. 09-01-09: ADDED 6" BROKEN WHITE LINE TO PARALLEL ACCELERATION LANE.
- REV. 11-01-11: REVISED PAVEMENT MARKINGS FOR EXIT ONLY LANE DETAIL, EXIT ONLY WITH OPTIONAL LANE DETAIL, TAPERED ACCELERATION LANE DETAIL, AND PARALLEL ACCELERATION LANE DETAIL. DELETED GENERAL NOTE (B).
- REV. 01-12-12: CHANGED SNOW PLOWABLE MARKERS FROM MONO-DIRECTIONAL TO BI-DIRECTIONAL 2-COLOR.
- REV. 05-24-12: REVISED PAVEMENT MARKINGS FOR TAPERED ENTRANCE AND EXIT AND PARALLEL ENTRANCE AND EXIT RAMPS.
- REV. 06-22-12: REVISED SPACING FOR SNOW PLOWABLE MARKINGS IN EXIT ONLY DETAILS.
- REV. 01-07-19: REVISED DETAILS TAPERED ACCELERATION LANE ENTRANCE RAMPS AND PARALLEL ACCELERATION LANE.
- REV. 06-28-19: REVISED SPACING FOR 6" DOTTED WHITE LINE ON DETAIL FOR TAPERED ACCELERATION LANE ENTRANCE RAMPS AND PARALLEL ACCELERATION LANE. REDREW SHEET.
- REV. 06-15-21: ADDED AUXILIARY LANE AT CLOSELY SPACED RAMPS DETAIL.

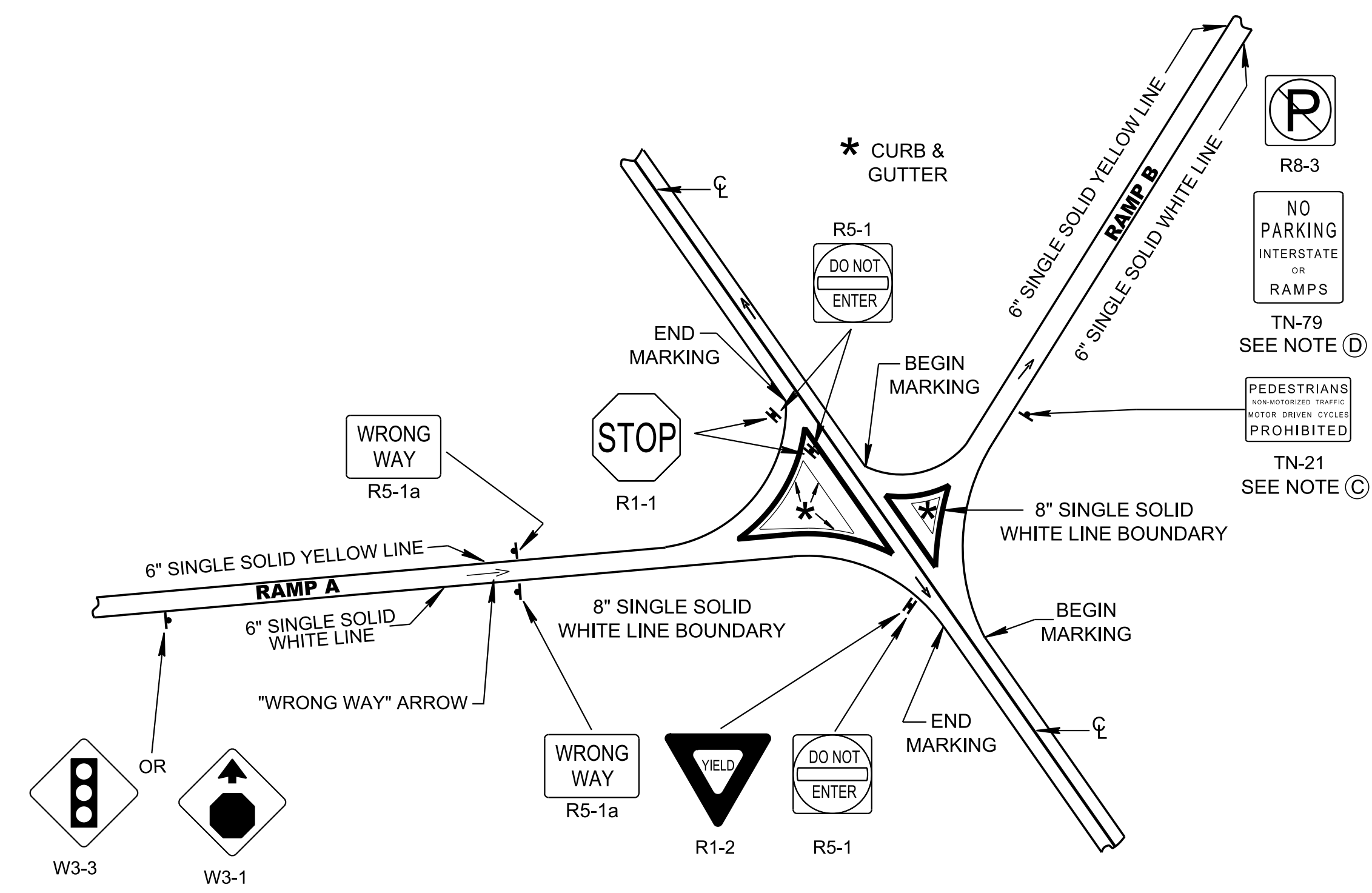
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

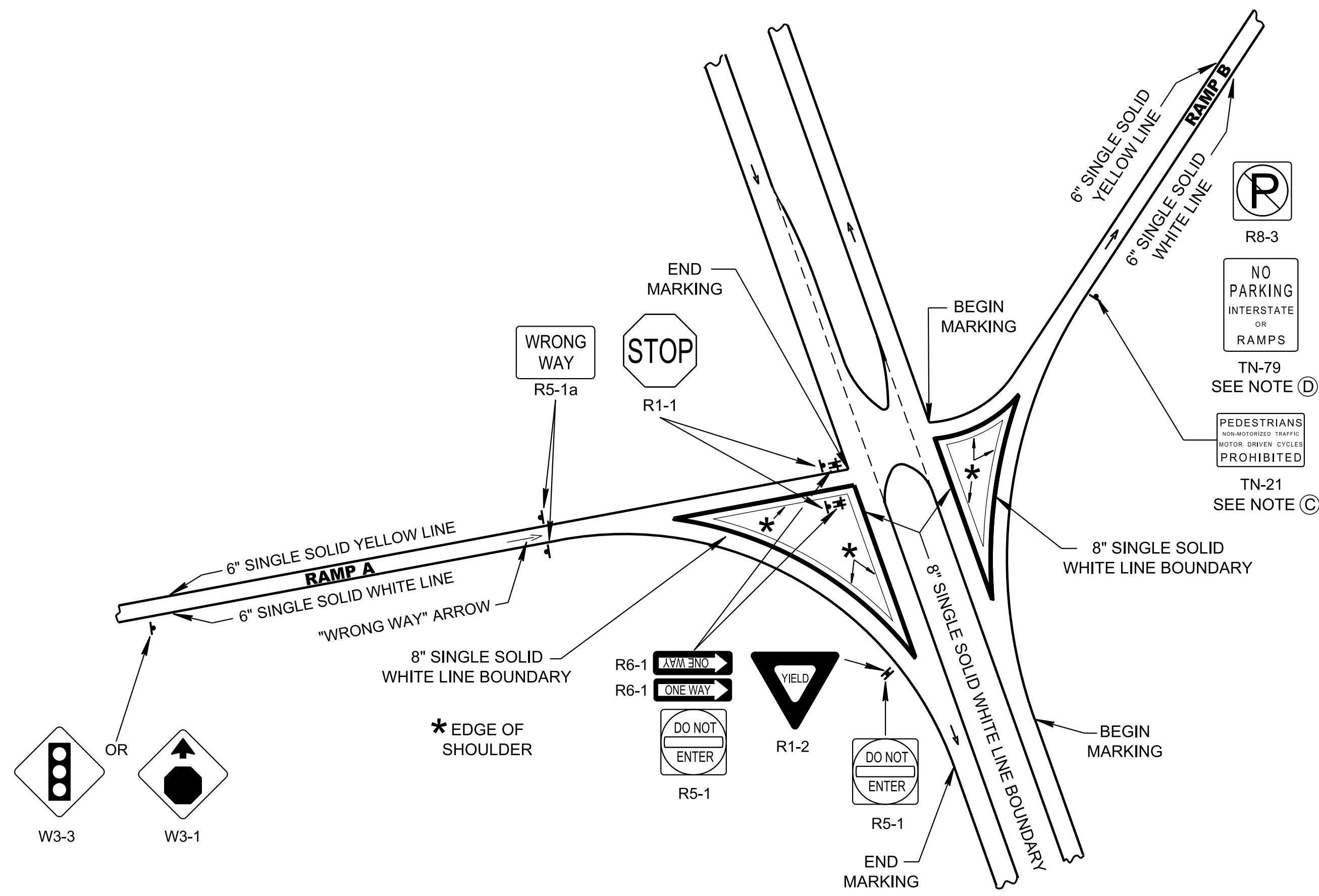
MARKING DETAIL FOR EXPRESSWAY AND FREEWAY INTERCHANGES



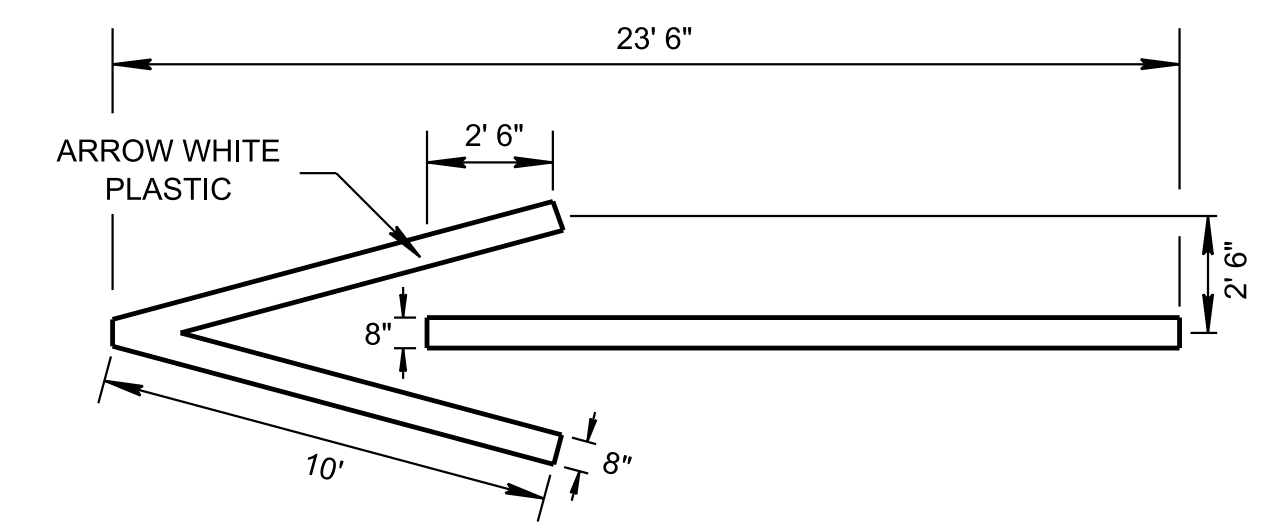
**DETAIL SHOWING RAMP INTERSECTION
(WITHOUT ISLANDS)**



**DETAIL SHOWING RAMP INTERSECTION
(WITH RAISED ISLANDS)**



**DETAIL SHOWING RAMP INTERSECTION
(WITH DEPRESSED ISLANDS)**



**WRONG WAY
PAVEMENT ARROW DETAILS**
PAVEMENT FOR WRONG WAY PAVEMENT ARROW IN PLACE
WILL BE MADE UNDER ITEM NUMBER 716-04.06 PLASTIC
PAVEMENT MARKING (WRONG WAY ARROW) PER EACH.

- GENERAL NOTES**
- (A) SEE STANDARD DRAWING NO. T-M-3 FOR ADDITIONAL DETAILS FOR ISLAND CHANNELIZATION MARKINGS.
 - (B) "WRONG WAY" ARROWS TO BE LOCATED APPROXIMATELY 200 FEET FROM STOP BAR OR AT THE SAME LOCATION AS THE WRONG WAY SIGNS. "WRONG WAY" ARROWS SHALL BE USED ON SINGLE LANE RAMPS ONLY. FOR RAMPS WITH MORE THAN ONE LANE TURN LANE ARROWS SHOULD BE USED.
 - (C) TN-21 TO BE INSTALLED ON ALL ON-RAMPS TO ACCESS CONTROLLED ROUTES. THIS SIGN SHOULD BE LOCATED AS NEAR TO THE ON-RAMP ENTRANCE AS POSSIBLE AND POSITIONED SO THAT ANY PEDESTRIAN, MOTOR DRIVEN CYCLE OR PROHIBITED NON-MOTORIZED TRAFFIC CAN SEE THE SIGN AS SOON AS POSSIBLE.
 - (D) TN-79 AND R8-3 TO BE INSTALLED WHEN THE SHOULDER OF THE RAMP WOULD ALLOW FOR SUCH PARKING. SEE TENNESSEE SUPPLEMENT TO THE STANDARD HIGHWAY SIGNS BOOK FOR GUIDANCE ON PLACEMENT.

- REV. 3-22-85: REVISED TO SHOW 8" BOUNDARY AROUND ISLANDS.
- REV. 2-22-88: ADDED REFERENCE NOTE FOR DWG. NO. T-M-3. CHANGED DWG. NO. FROM T-M-6 TO T-M-9.
- REV. 7-15-91: REORGANIZED AND REDREW SHEET.
- REV. 7-29-98: CHANGED WIDTH OF CENTERLINES, EDGLINES AND DOTTED WHITE LANE LINES FROM 4 TO 6 INCHES.
- REV. 12-12-00: MOVED WRONG WAY PAVEMENT ARROW DETAILS FROM STD. DWG. NO. T-S-11. ADDED WRONG WAY SIGNS AND ARROWS TO ALL PLAN VIEWS. ADDED GENERAL NOTE (B).
- REV. 11-30-04: CHANGED WRONG WAY SIGN DESIGNATION FROM R5-9 TO R5-1a.
- REV. 11-11-11: ADDED ADDITIONAL SIGNS TO RAMP INTERSECTION DETAIL.
- REV. 06-28-19: REDREW SHEET.
- REV. 06-15-21: ADDED GENERAL NOTES (A) AND (D). ADDED ADDITIONAL SIGNS TO RAMP INTERSECTION DETAILS.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED

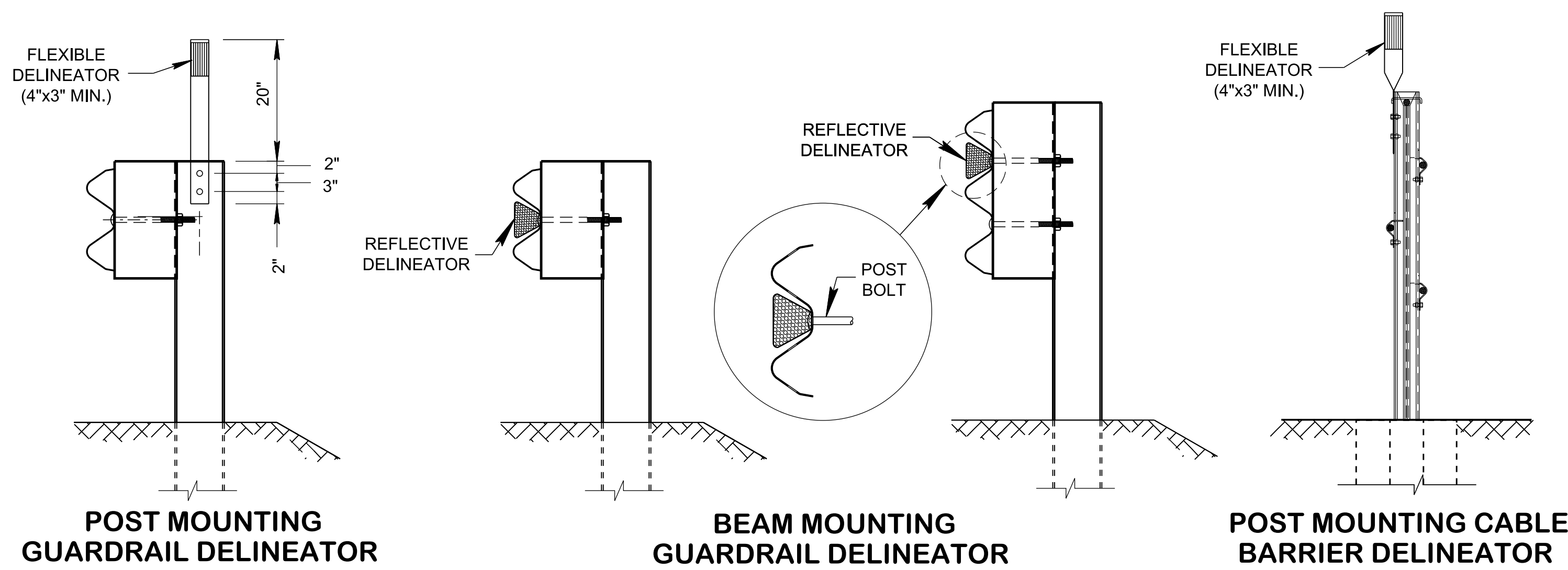
STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKING
AND
SIGNING DETAILS
FOR RAMP
INTERSECTIONS**

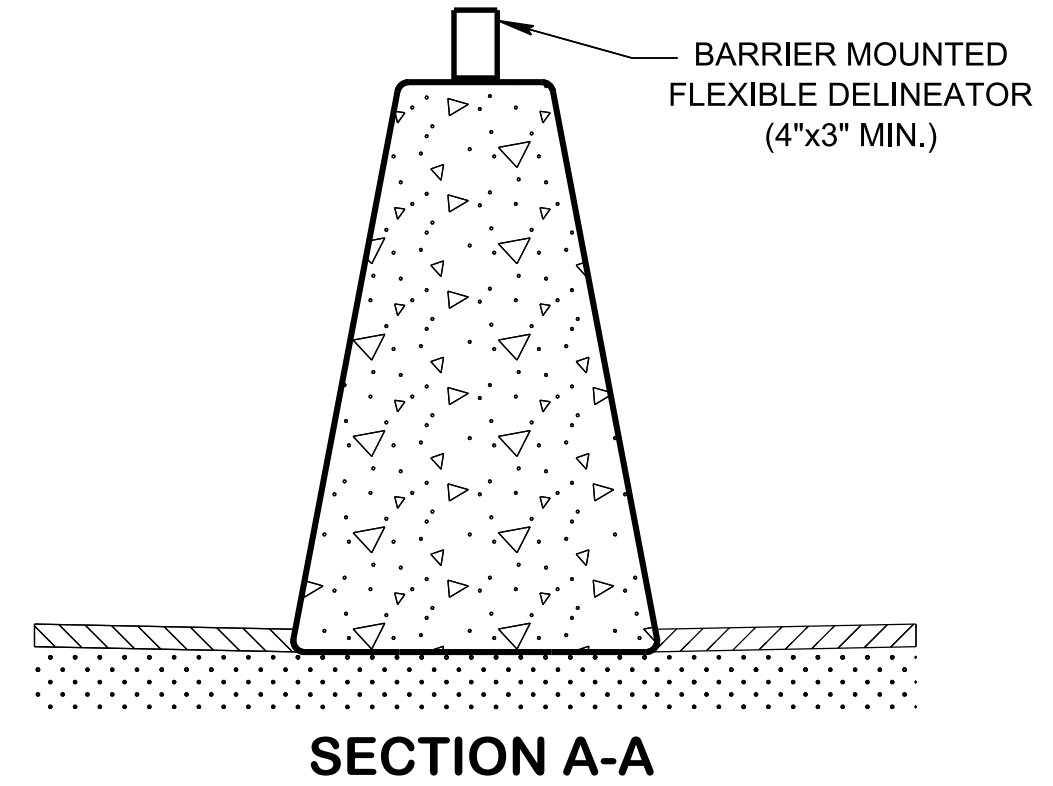
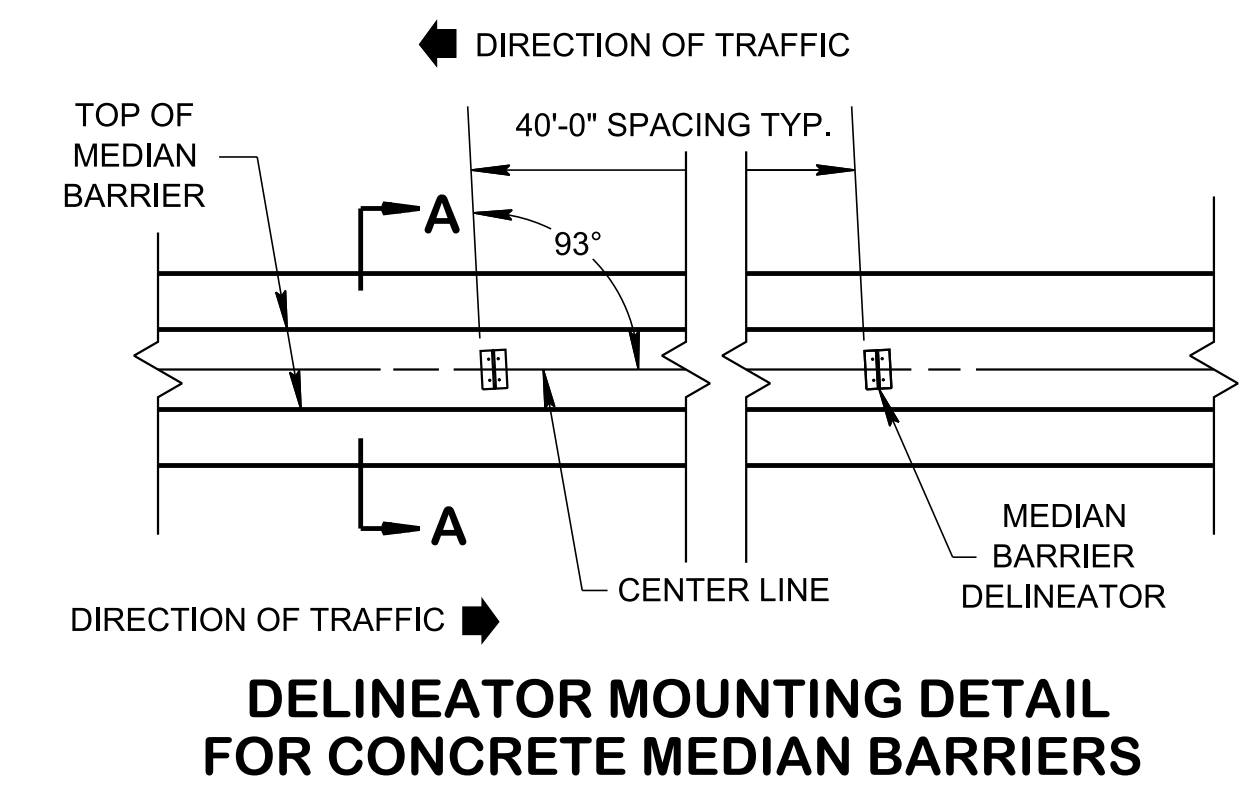
T-M-9

6/16/2021 9:15:54 AM P:\StandDraw\DESIGN STANDARDS\Standards Drawings Library\Standard Roadway Drawings - CURRENT\In Progress\10-107.00 Design - Traffic Control\IP\170.01 Pavements Markings\IP\170.01 Pavements Markings\IP\170.01 Pavements Markings\IP\170.01 Pavements Markings.dgn

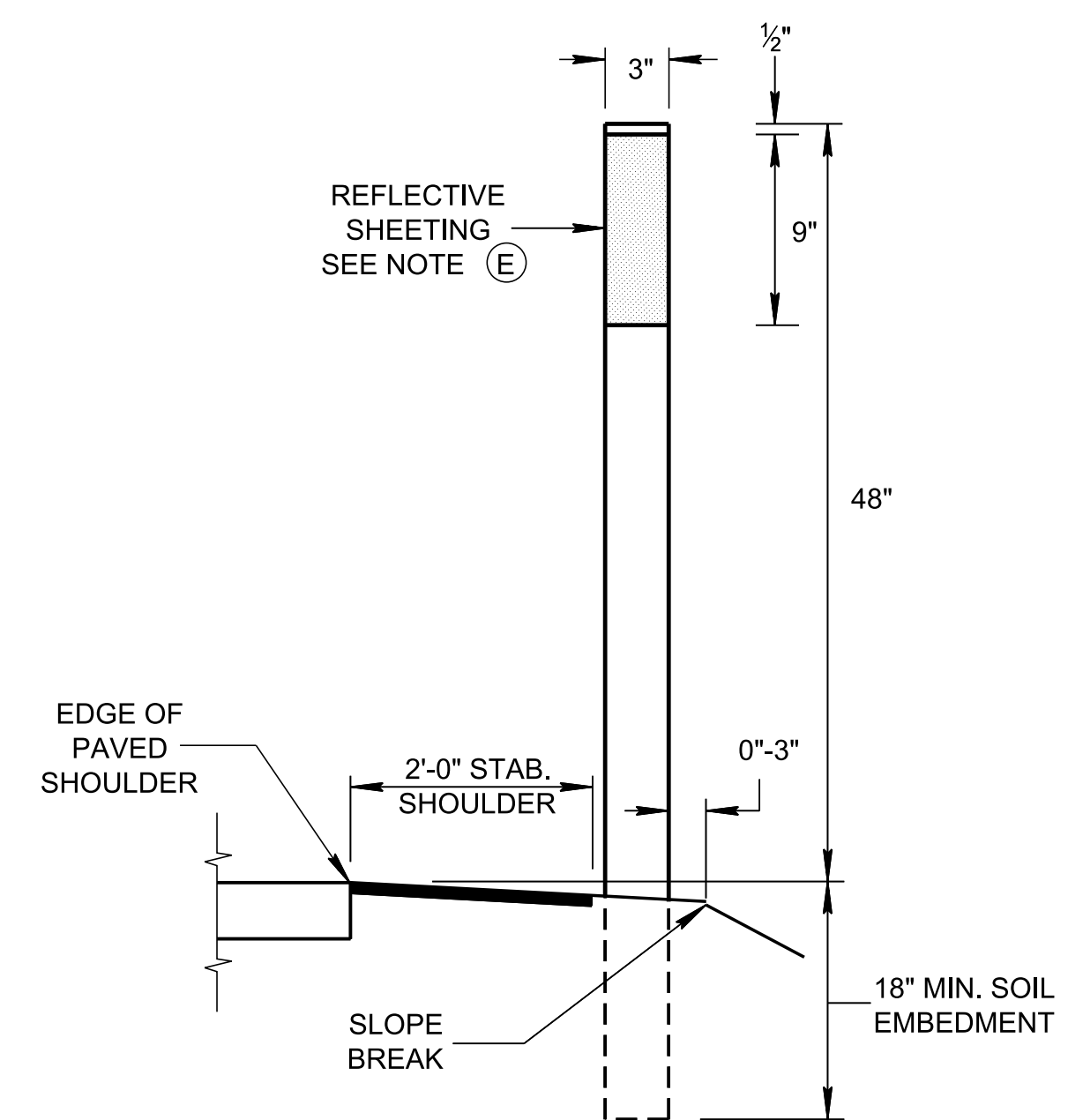
REV. 06-15-2021: ADDED FLEXIBLE DELINEATOR MOUNTING DETAILS AND NOTES FOR GUARDRAILS, CABLE BARRIER AND CONCRETE MEDIAN BARRIERS.



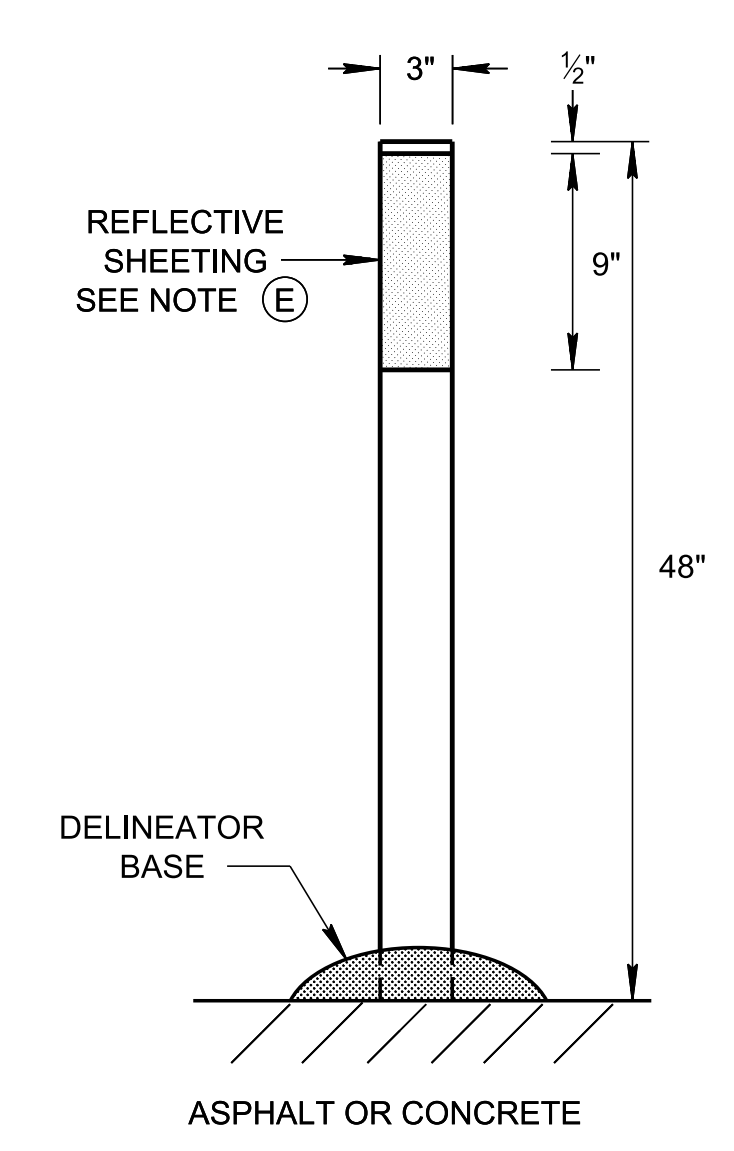
FLEXIBLE DELINEATOR NOTES FOR GUARDRAILS AND CABLE BARRIERS	
<p>(A) BARRIER DELINEATOR REFLECTIVE SHEETING SHALL MEET ASTM D4956, TYPE V SPECIFICATIONS. DELINEATORS WITH DIMENSIONS OTHER THAN 4" X 3" MAY BE USED IF THE PRODUCT IS ON THE QUALIFIED PRODUCTS LIST. THE VARIATIONS IN DELINEATOR DIMENSION SHOULD NOT EXCEED ± 10%. DIFFERENT SIZE OR MANUFACTURED MEDIAN BARRIER DELINEATORS SHOULD NOT BE MIXED IN THE SAME LINE.</p> <p>(B) THE COLOR OF DELINEATORS SHALL CONFORM TO THE COLOR OF EDGELINES STIPULATED IN SECTION 3B.06 OF THE MUTCD (CURRENT EDITION).</p> <p>(C) DELINEATORS SHALL BE FACED TOWARD THE APPROACHING TRAFFIC IN THE LANE ADJACENT TO THE GUARDRAIL AT ALL LOCATIONS.</p> <p>(D) FLEXIBLE DELINEATOR SPACING SHALL BE 50 FT OR LESS ON GUARDRAIL POSTS OR GUARDRAIL DELINEATOR SPACING SHALL BE DIRECTED BY THE REGIONAL TRAFFIC ENGINEER.</p> <p>(E) FLEXIBLE DELINEATOR SPACING SHALL BE ONE DELINEATOR INSTALLED ON AT LEAST ONE OUT OF TWO POSTS IN SEQUENCE ON CABLE BARRIER POSTS OR DIRECTED BY THE REGIONAL TRAFFIC ENGINEER.</p> <p>(F) SEE STANDARD DRAWING S-PL-3 FOR DELINEATOR PLACEMENT AT BRIDGE APPROACHES.</p>	<p>(G) DELINEATORS SHALL BE FIRMLY SECURED TO THE POST BY TWO CONNECTIONS APPROVED BY THE ENGINEER OR MANUFACTURER SPECIFICATION.</p> <p>(H) THE TWO HOLES IN THE STEEL GUARDRAIL POSTS ARE USED TO ATTACH THE DELINEATOR POST IN THE FIELD. THE HOLES SHALL BE 1/4" IN DIAMETER. IF THE HOLES ARE SHOP DRILLED, THEY SHALL BE DRILLED PRIOR TO GALVANIZING THE POST. IF THE HOLES ARE FIELD DRILLED, THEY SHALL BE THOROUGHLY PAINTED WITH A TOUCH-UP GALVANIZING SPRAY PAINT PRIOR TO ATTACHING THE DELINEATOR POST.</p> <p>(I) THE COST OF FURNISHING AND INSTALLING DELINEATORS, INCLUDING ALL MATERIALS, LABOR, AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR THE ITEMS OF GUARDRAIL TO WHICH THE DELINEATORS ARE ATTACHED.</p> <p>(J) ONLY DELINEATORS LISTED ON THE QPL 1, SECTION G: GUARDRAIL AND BARRIER/ PARAPET DELINEATION, MAY BE USED.</p> <p>(K) DELINEATORS ARE NOT REQUIRED IF GUARDRAIL IS TERMINATED PRIOR TO INDICATED LOCATION.</p> <p>(L) SEE STANDARD DRAWING S-GR SERIES FOR GUARDRAIL DETAILS AND S-CB SERIES FOR CABLE BARRIER DETAILS.</p>



FLEXIBLE DELINEATOR NOTES FOR MEDIAN BARRIERS	
<p>(A) MEDIAN BARRIER DELINEATOR REFLECTIVE SHEETING SHALL MEET ASTM D4956, TYPE V SPECIFICATIONS. DELINEATORS WITH DIMENSIONS OTHER THAN 4" X 3" MAY BE USED IF THE PRODUCT IS ON THE QUALIFIED PRODUCTS LIST. THE VARIATIONS IN DELINEATOR DIMENSION SHOULD NOT EXCEED ± 10%. DIFFERENT SIZE OR MANUFACTURED MEDIAN BARRIER DELINEATORS SHOULD NOT BE MIXED IN THE SAME LINE.</p> <p>(B) MEDIAN BARRIER DELINEATORS SHALL BE HIGH IMPACT, UV-STABILIZED, ENGINEERED THERMOPLASTIC OR POLYCARBONATE SUBSTRATE. SEE TDOT APPROVED QUALIFIED PRODUCT LISTS FOR ACCEPTABLE PRODUCTS.</p> <p>(C) MEDIAN BARRIER DELINEATORS WILL NOT BE REQUIRED IN AREAS WHERE ROADWAY IS LIGHTED.</p> <p>(D) SINGLE WHITE REFLECTIVE SHEETING WILL BE SUBSTITUTED FOR THE DOUBLE YELLOW REFLECTIVE SHEETING WHEN TRAFFIC ON EACH SIDE OF THE BARRIE IS GOING IN THE SAME DIRECTION.</p>	<p>(E) THE COST OF FURNISHING AND INSTALLING MEDIAN BARRIER DELINEATORS, INCLUDING ALL MATERIALS, LABOR, AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN BID PRICE FOR CONCRETE MEDIAN BARRIER.</p> <p>(F) MEDIAN BARRIER DELINEATORS SHALL BE MOUNTED TO THE CONCRETE MEDIAN BARRIER WITH A ONE COMPONENT ADHESIVE AS RECOMMENDED BY THE MANUFACTURER. THEY SHALL BE INSTALLED NO EARLIER THAN THREE WEEKS AFTER THE TEXTURE COATING HAS BEEN APPLIED.</p> <p>(G) ONLY DELINEATORS LISTED ON THE QPL 1, SECTION G: GUARDRAIL AND BARRIER/ PARAPET DELINEATION MAY BE USED.</p> <p>(H) SEE STANDARD DRAWING S-SSMB SERIES FOR CONCRETE MEDIAN BARRIER DETAILS.</p>



GROUND MOUNTED FLEXIBLE DELINEATOR



SURFACE MOUNTED FLEXIBLE DELINEATOR
SEE NOTE (I)

GENERAL NOTES	
(A)	THE REFLECTIVE SHEETING SHALL MEET THE REQUIREMENTS OF AASHTO M268, TYPE III OR HIGHER RETROREFLECTION PERFORMANCE LEVEL.
(B)	THE REFLECTIVE SHEETING STRIP ON THE DELINEATORS SHALL BE MIN. 9 INCHES IN LENGTH AND SUFFICIENT WIDTH TO PROVIDE A MIN. 3 INCHES WIDE PROFILE FACING APPROACHING TRAFFIC. THE VARIATIONS IN REFLECTIVE SHEETING DIMENSION SHOULD NOT EXCEED ± 10%.
(C)	THE CONTRACTOR SHALL SELECT MATERIAL FROM THE DEPARTMENT'S QPL.
(D)	THE COLOR OF THE DELINEATOR POST SHALL BE WHITE UNLESS OTHERWISE NOTED ON THE PLANS.
(E)	THE COLOR OF THE REFLECTIVE SHEETING SHALL CONFORM TO THE COLOR OF EDGE LINES STIPULATED IN SUBSECTION 3B-6 (PAGE 3B-8 AND 3B-11) OF THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
(F)	PAYMENT FOR GROUND MOUNTED FLEXIBLE DELINEATORS WILL BE MADE AS FOLLOWS ITEM NO'S.:
	713-02.14, FLEXIBLE DELINEATOR (WHITE), PER EACH.
	713-02.15, FLEXIBLE DELINEATOR (YELLOW), PER EACH.
	713-02.16, FLEXIBLE TYPE II, OBJECT MARKER, PER EACH.
	713-02.33, FLEXIBLE DELINEATOR (RED), PER EACH.
(G)	PAYMENT FOR SURFACE MOUNTED FLEXIBLE DELINEATORS WILL BE MADE AS FOLLOWS ITEM NO.:
	713-02.30, FLEXIBLE TUBULAR DELINEATOR, PER EACH.
(H)	SPACING FOR SURFACE MOUNTED FLEXIBLE DELINEATOR POSTS MAY BE 20' OR LESS OR DIRECTED BY THE REGIONAL TRAFFIC ENGINEER. SEE STANDARD DRAWING T-S-11 FOR MORE INFORMATION.
(I)	SURFACE MOUNTED FLEXIBLE DELINEATORS SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
(J)	ONLY PRODUCTS LISTED ON THE DEPARTMENT'S QPL SHALL BE USED.

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

FLEXIBLE DELINEATOR DETAILS