

MINNESOTA DEPARTMENT OF TRANSPORTATION DEVELOPED BY: Design Standards ISSUED BY: Office of Project Management and Technical Support, Design Support Section	TRANSMITTAL LETTER NO. (20-03) MANUAL: Standard Plans DATED: April 17, 2020
SUBJECT: Standard Plans 681 and 731	

The following Standard Plan has been updated:
5-297.681 – Concrete Median Barrier Single Slope

The following Standard Plan has been revised:
5-297.731 – Sign Mounting Details for Signal Mast Arms

INSTRUCTIONS:

1. Record the transmittal letter number, date and subject on the transmittal record sheet located in the front of the manual. The previous Transmittal Letter issued for this manual was 20-02, dated April 6, 2020.
2. Remove from the manual:
 - Standard Plan Index (Sheets 1-6 of 6)
 - 5-297.681 (Sheets 1-6 of 6) (8-10-2016)
 - 5-297.731 (Sheets 1 of 1) (10-16-2019)
3. Insert in the manual:
 - Standard Plan Index (Sheets 1-6 of 6) (April 17, 2020)
 - 5-297.681 (Sheets 1-7 of 7) (4-14-2019)
 - 5-297.731 (Sheet 1 of 1) (10-16-2019, Revised 4-17-2020)
4. Current Standard Plans and Transmittal Letters are available on the web at <http://standardplans.dot.state.mn.us/StdPlan.aspx>.
5. Questions regarding this transmittal should be directed to the Design Standards Unit at DesignStandards.dot@state.mn.us.



Michael Elle, P.E.
State Design Standards Engineer

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Summary of Changes
Standard Plan 5-297.681 – Concrete Median Barrier Single Slope
Transmittal Letter No. (20-03)

General

1. A new sheet (6 of 7) has been added to this set, which requires the renumbering of the other sheets
2. Minor grammar, clarity, labeling, consistency, and format revisions on sheets 1-5 of 7 and 7 of 7

Sheet 3 of 7 – Concrete Median Barrier Single Slope – Type 36 A-A, Type 42 A-A, and Type 54 A-A**Notes**

1. Note ⑧ revised to eliminate redundancy with Spec Book.

Sheet 5 of 7 – Concrete Median Barrier Single Slope - Light Pole Foundation / Sign Base Transition – Monolithic Barrier Placement**General**

1. Sheet number changed from (5 of 6) to (5 of 7); added “Monolithic Barrier Placement” to title block

Details

1. The median barrier section with light pole has been modified in length from 20'-0" to 15'-0"
2. Modifying the barrier section length has changed the vertical reinforcement spacing and the taper of the barrier
3. 1" chamfers have been added to the inside corners of the concrete at the anchor rod cluster location to deter cracking of the concrete
4. Horizontal “Z” bars have been added at the anchor rod cluster location to deter cracking of the concrete
5. Reinforcement bar bend details and the reinforcement bar list have been updated to reflect the barrier modifications. Reinforcing bar “T” was also added
6. The anchor rod cluster has been renamed anchor rod assembly, and an anchor rod template was added, both of which are further detailed on Standard Plate 8332
7. The term “Nom. Dia. Rigid PVC” has been changed to “Nom. Dia. Rigid PVC Conduit” throughout the plate

Notes

1. Notes have been updated to active voice
2. The term “Anchor Bolt Cluster” has changed to “Anchor Rod Assembly” in numbered note ① and throughout the plate
3. Eliminated note ③ regarding conduit bell ends and added new note ③ Paring “T” bars with “L2” bars
4. Numbered notes ⑪, ⑫ and ⑬ have been added to the notes

Sheet 6 of 7 – Concrete Median Barrier Single Slope - Light Pole Foundation / Sign Base Transition – Barrier on Footing**General**

1. This is a new sheet that provides light pole foundation details for a single-slope median barrier placed on a footing. The details are nearly identical to sheet 5-297.681 (5 of 7) for monolithic placement but the reinforcement details have been changed to reflect the 7" thick footing at the base of the barrier.

Summary of Changes
Standard Plan 5-297.731
Sign Mounting Details for Signal Mast Arms
Transmittal Letter No. (20-03)

General

1. Note ① was added at the request of Maintenance.
2. Two lines were added to the data table for clarity.

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5-297.200	SURFACING
5-297.300	VEGETATION
5-297.400	DRAINAGE, EROSION CONTROL, AND SEDIMENT CONTROL
5-297.500	BLANK
5-297.600	SAFETY FEATURES AND SPECIAL STRUCTURES
5-297.700	SIGNING
5-297.800	TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKING, LIGHTING, AND SIGNALS

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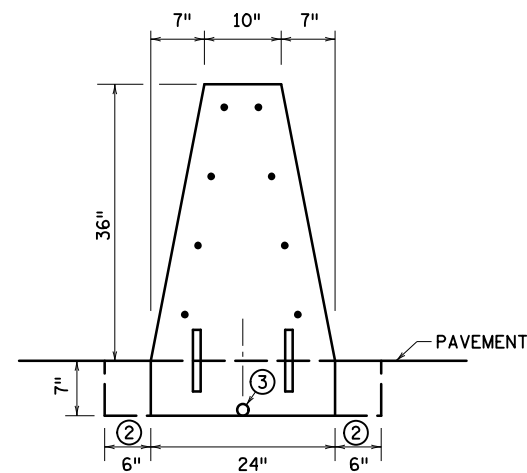
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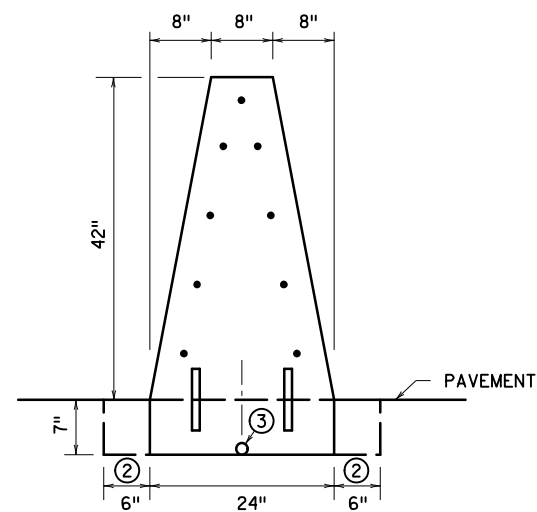
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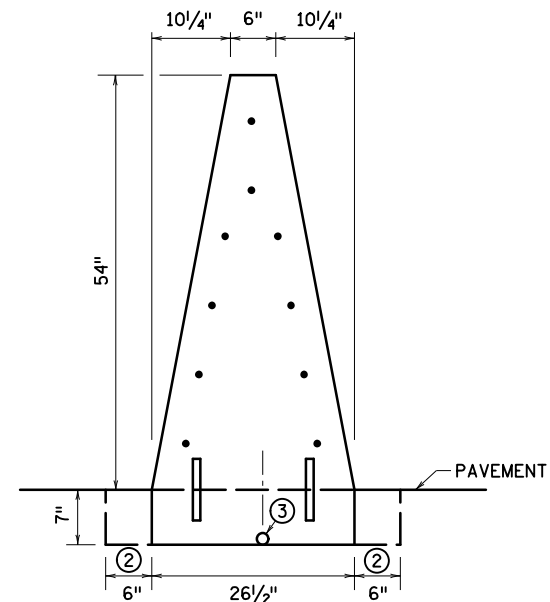
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5-297.762	Standard Overhead Sign Structures - Design D - Camber, Post Type, and Estimated Quantities	03/05/20	
5-297.763 (1 of 2)	Standard Overhead Sign Structures - Design D - Foundation Details	03/05/20	
5-297.763 (2 of 2)	Standard Overhead Sign Structures - Design D - Foundation Details	03/05/20	
5-297.764	Standard Overhead Sign Structures - Design D - Base Plate, Handhole, Electrical, and Cover Plate Details	03/05/20	
5-297.765	Standard Overhead Sign Structures - Design D - Truss-to-Post Connection Details	03/05/20	
5-297.766	Standard Overhead Sign Structures - Design D - Sign Truss Details Type A	05/01/19	05/28/19
5-297.767	Standard Overhead Sign Structures - Design D - Sign Truss Details Type B	05/01/19	05/28/19
5-297.768	Standard Overhead Sign Structures - Design D - Sign Truss Details Type C	05/01/19	05/28/19
5-297.769 (1 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details	03/05/20	
5-297.769 (2 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details: Railing	03/05/20	
5-297.769 (3 of 3)	Standard Overhead Sign Structures - Design D - Walkway Details	05/01/19	
5-297.770	Standard Overhead Sign Structures - Design D - Walkway and Railing Retrofit Details	05/01/19	
5-297.771	Standard Overhead Sign Structures - Design D - Sign Panel and Panel Mounting Post Details	05/01/19	05/28/19
5-297.772	Standard Overhead Sign Structures - Design D - DMS Mounting Details	03/05/20	
5-297.800			
TEMPORARY TRAFFIC CONTROL, PAVEMENT MARKING, LIGHTING, AND SIGNALS			
5-297.801	Interim Pavement Markings and Signing	10/10/19	
5-297.805 (1 of 5)	Temporary Overhead Sign Structures – General Elevation and Notes	03/06/20	
5-297.805 (2 of 5)	Temporary Overhead Sign Structures – Foundation Details	03/06/20	
5-297.805 (3 of 5)	Temporary Overhead Sign Structures – Post and Baseplate Details	03/06/20	
5-297.805 (4 of 5)	Temporary Overhead Sign Structures – Beam Details	03/06/20	
5-297.805 (5 of 5)	Temporary Overhead Sign Structures – Sign Panel and Panel Mounting Post Details	03/06/20	
5-297.820 (1 of 3)	T-100 Light Tower Pile Foundation Design	11/05/19	
5-297.820 (2 of 3)	T-120 Light Tower Pile Foundation Design	11/05/19	
5-297.820 (3 of 3)	T-140 Light Tower Pile Foundation Design	11/05/19	
5-297.821 (1 of 3)	T-100 Light Tower Mat Foundation Design	11/05/19	
5-297.821 (2 of 3)	T-120 Light Tower Mat Foundation Design	11/05/19	
5-297.821 (3 of 3)	T-140 Light Tower Mat Foundation Design	11/05/19	



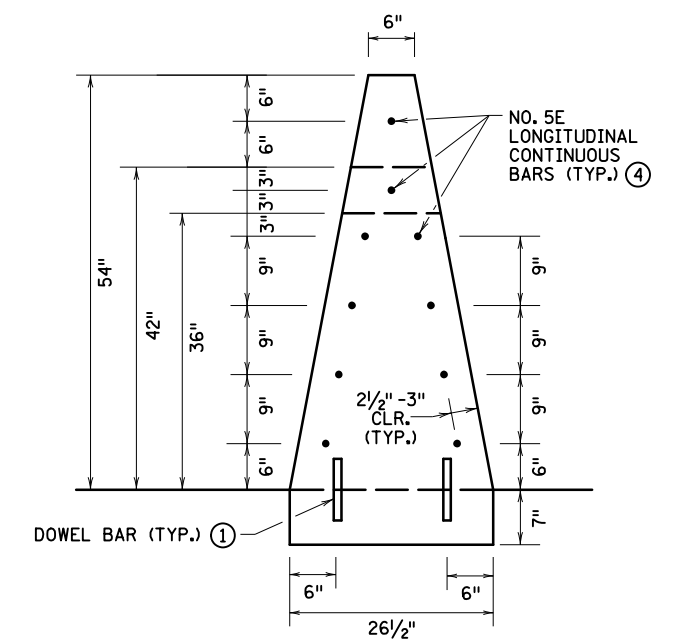
TYPE 36 A



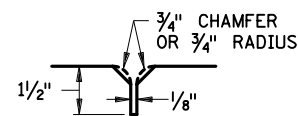
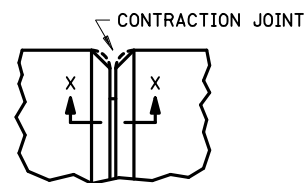
TYPE 42 A



TYPE 54 A



REINFORCEMENT
DETAIL



SECTION X-X

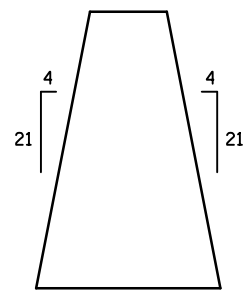
CONTRACTION JOINT

TYPE A, TYPE A STEP, AND TYPE A-A MEDIAN BARRIERS;
END ANCHOR BARRIER; AND LIGHT POLE
FOUNDATION/SIGN BASE TRANSITION BARRIER

CONTRACTION JOINT NOTES:

IF JOINT SPACING IS NOT INDICATED IN THE PLANS, THE BASIS OF
JOINT SPACING IS AS FOLLOWS:

- 1) BITUMINOUS SECTION ADJACENT TO THE BARRIER: 15' SPACING.
- 2) CONCRETE SECTION ADJACENT TO THE BARRIER: BARRIER
CONTRACTION JOINTS SHALL ALIGN WITH JOINTS IN CONCRETE
SECTION, NOT TO EXCEED 15'.
- 3) REINFORCING TO BE CONTINUOUS THROUGH JOINT.
- 4) IF FOOTING IS CONSTRUCTED SEPARATELY, PLACE BARRIER JOINTS
DIRECTLY ABOVE FOOTING JOINTS.



BARRIER FACE SLOPE VALUE
ALL TYPE A BARRIERS

SINGLE SLOPE BARRIER BILL OF REINFORCEMENT		
BARRIER TYPE	LONGITUDINAL BAR SIZE	NUMBER OF BARS EACH
36 A	5E	8
42 A	5E	9
54 A	5E	10

NOTES:

ALL BARS EPOXY-COATED PER SPEC. 3301, UNLESS OTHERWISE NOTED.

USE 3/4" CHAMFER OR 1" RADIUS ON ALL EXPOSED SHARP EDGES
UNLESS OTHERWISE NOTED.

DURING SLIP-FORM CONSTRUCTION, PROVIDE ALL NECESSARY
SUPPORTS NEEDED TO MAINTAIN LONGITUDINAL REINFORCEMENT
BARS AT SPECIFIED DIMENSIONS (INCIDENTAL).

DURING FIXED-FORM CONSTRUCTION, MAINTAIN LONGITUDINAL
REINFORCEMENT BARS AT DIMENSIONS SHOWN ON THE PLAN BY
PROVIDING VERTICAL SUPPORT BARS AT 2' 0" MAXIMUM SPACING
(INCIDENTAL).

- ① IF FOOTING IS CONSTRUCTED SEPARATELY, PROVIDE TWO 1" DIAMETER
DOWEL BARS (OR REBARS) 8" LONG AND SPACED EVERY 2' 0" ON
CENTER. PROVIDE A ROUGH TEXTURE ON SURFACE OF FOOTING.
- ② 6" ADDITIONAL FOOTING WIDTH REQUIRED WHEN CONCRETE
MEDIAN BARRIER IS ADJACENT TO BITUMINOUS PAVEMENT OR
BITUMINOUS SHOULDER.
- ③ WHEN REQUIRED, PROVIDE A 1/2" NOMINAL DIAMETER PVC-TYPE I
CONDUIT (SPEC. 3803). LOCATE AS DIRECTED BY PLAN OR ENGINEER.
- ④ CONTINUOUS NO. 5E LONGITUDINAL REINFORCEMENT BARS WITH
2 1/2" - 3" MINIMUM CLEARANCE EVENLY SPACED AS SHOWN IN THE
DETAILS. MINIMUM LAP SPLICE IS 3' 1" FOR ALL BARS. SEE
TABLE FOR BAR QUANTITIES.

REVISION:
APPROVED: APRIL 14, 2020
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STANDARD PLAN 5-297.681

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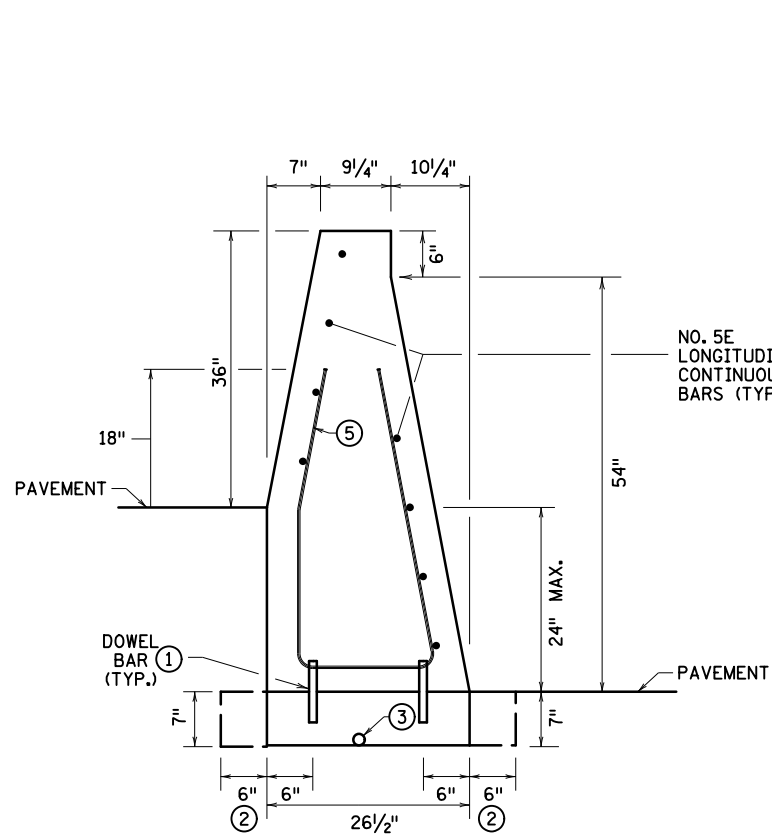
Tom Styrbicki
THOMAS STYRBICKI
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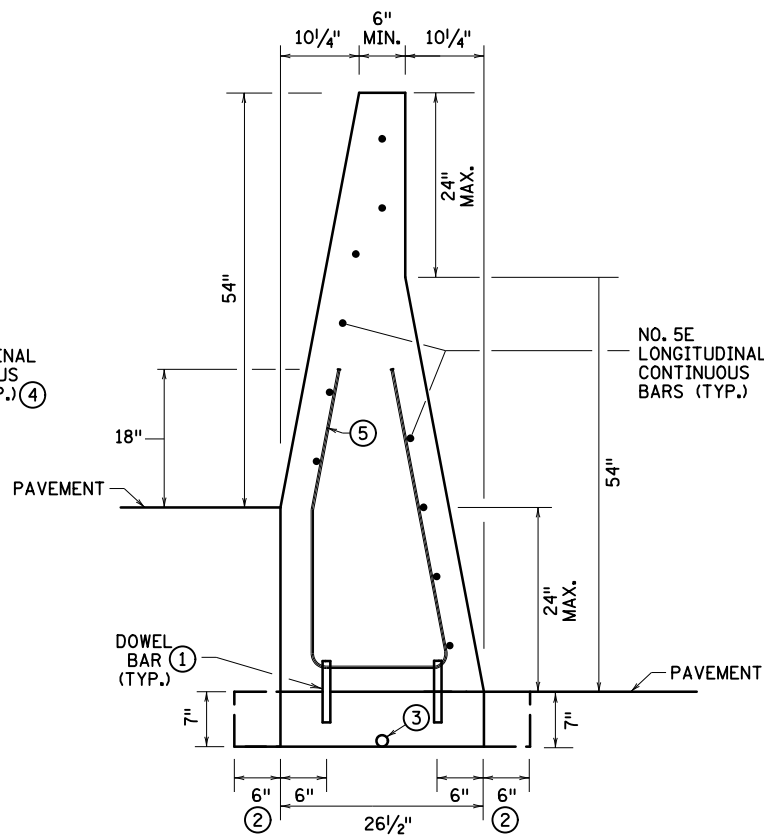
STATE PROJ. NO.

CONCRETE MEDIAN BARRIER SINGLE SLOPE
TYPE 36 A, TYPE 42 A, AND TYPE 54 A

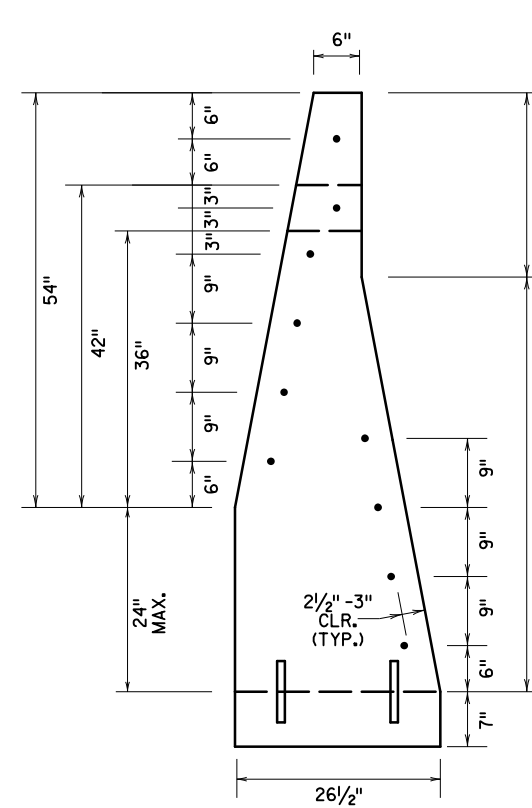
(TH) SHEET NO. OF SHEETS



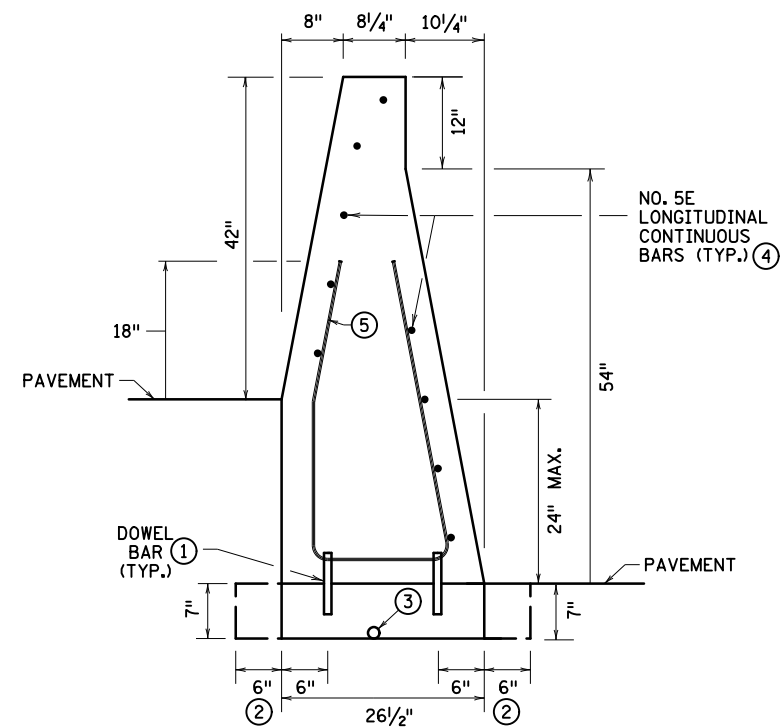
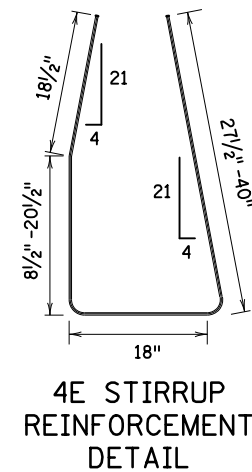
TYPE 36 A STEP
SINGLE SLOPE STEP OPTION



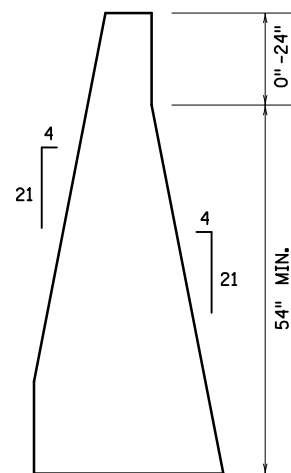
TYPE 54 A STEP
VERTICAL STEP OPTION



LONGITUDINAL
REINFORCEMENT
DETAIL



TYPE 42 A STEP
SINGLE SLOPE STEP OPTION



BARRIER FACE SLOPE VALUE
ALL TYPE A STEP BARRIERS

SINGLE SLOPE BARRIER BILL OF REINFORCEMENT			
BARRIER TYPE	BAR SIZE	NUMBER OF BARS EACH	NOTE
36 A STEP	5E	8	LONGITUDINAL
	4E	1 @ 12"	STIRRUP AT 12"
42 A STEP	5E	9	LONGITUDINAL
	4E	1 @ 12"	STIRRUP AT 12"
54 A STEP	5E	10	LONGITUDINAL
	4E	1 @ 12"	STIRRUP AT 12"

NOTES:

ALL BARS EPOXY-COATED PER SPEC. 3301.

USE 3/4" CHAMFER OR 1" RADIUS ON ALL EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED.

DURING SLIP-FORM CONSTRUCTION, PROVIDE ALL NECESSARY SUPPORTS NEEDED TO MAINTAIN LONGITUDINAL REINFORCEMENT BARS AT SPECIFIED DIMENSIONS (INCIDENTAL).

DURING FIXED-FORM CONSTRUCTION, MAINTAIN LONGITUDINAL REINFORCEMENT BARS AT DIMENSIONS SHOWN ON THE PLAN BY PROVIDING VERTICAL SUPPORT BARS AT 2' 0" MAXIMUM SPACING (INCIDENTAL).

- ① IF FOOTING IS CONSTRUCTED SEPARATELY, PROVIDE TWO 1" DIAMETER DOWEL BARS (OR REBARS) 8" LONG AND SPACED EVERY 2' 0" ON CENTER. PROVIDE A ROUGH TEXTURE ON SURFACE OF FOOTING.
- ② 6" ADDITIONAL FOOTING WIDTH REQUIRED WHEN CONCRETE MEDIAN BARRIER IS ADJACENT TO BITUMINOUS PAVEMENT OR BITUMINOUS SHOULDER.
- ③ WHEN REQUIRED, PROVIDE A 1/2" NOMINAL DIAMETER PVC-TYPE I CONDUIT (SPEC. 3803). LOCATE AS DIRECTED BY PLAN OR ENGINEER.
- ④ CONTINUOUS NO. 5E LONGITUDINAL REINFORCEMENT BARS REQUIRE 2 1/2" - 3" CLEARANCE AND ARE EVENLY SPACED AS SHOWN IN THE DETAILS. MINIMUM LAP SPlice IS 3' 1" FOR ALL BARS. SEE TABLE FOR BAR QUANTITIES.
- ⑤ NO. 4E STIRRUP BARS, 6' LENGTH AT 12". VERTICAL REINFORCEMENT STIRRUP NOT REQUIRED FOR ROADWAY VERTICAL OFFSETS LESS THAN 12", AND OPTIONAL FOR OFFSETS UP TO 24".

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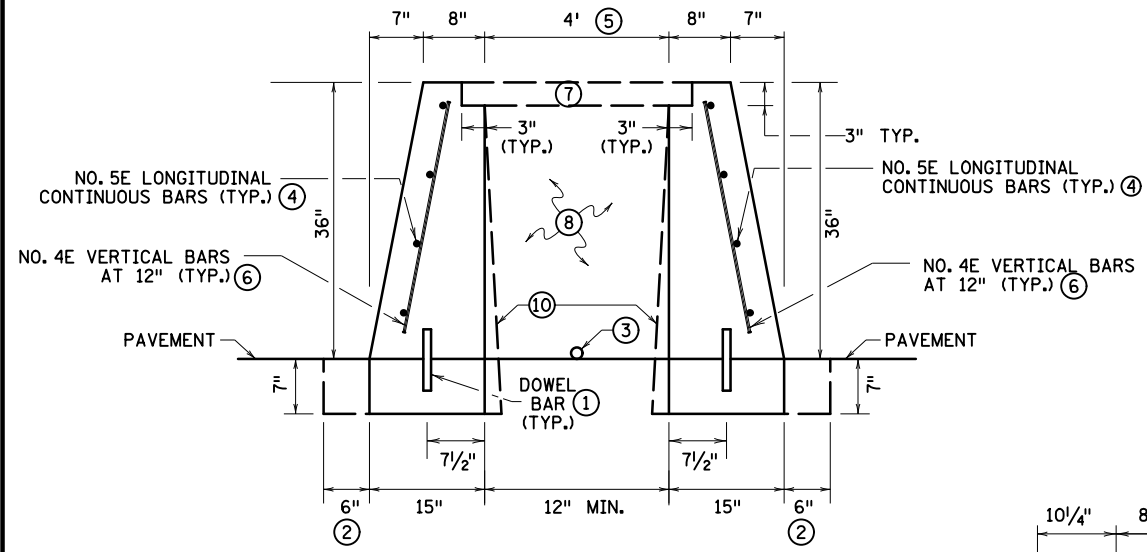
Tom Styrbicki
THOMAS STYRBICKI
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APPROVED: 4-14-2020
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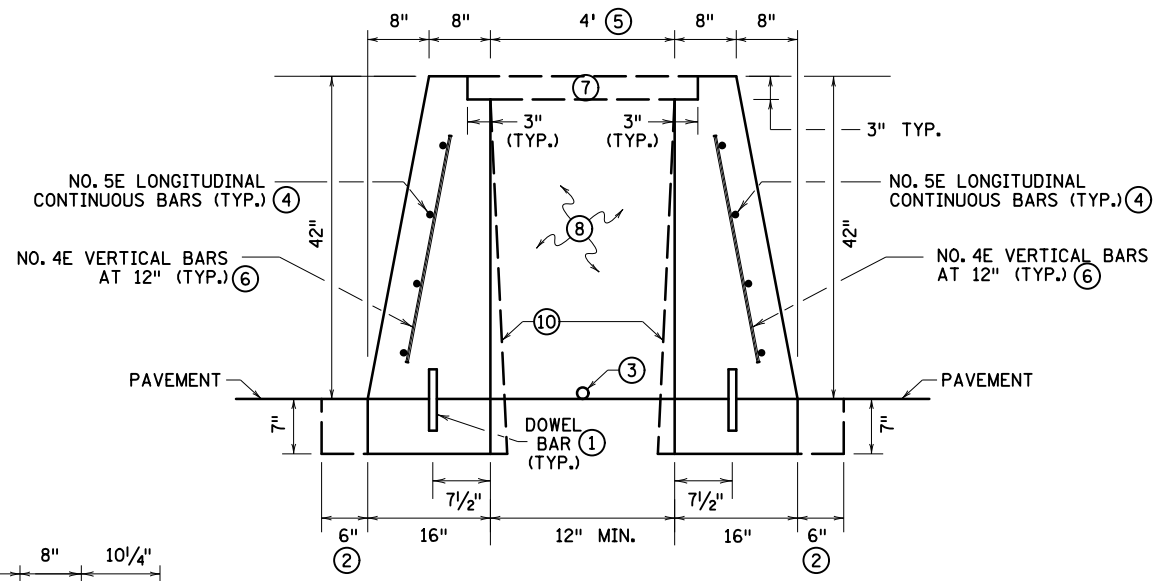
CONCRETE MEDIAN BARRIER SINGLE SLOPE
TYPE 36 A STEP, TYPE 42 A STEP, AND TYPE 54 A STEP

STATE PROJ. NO.

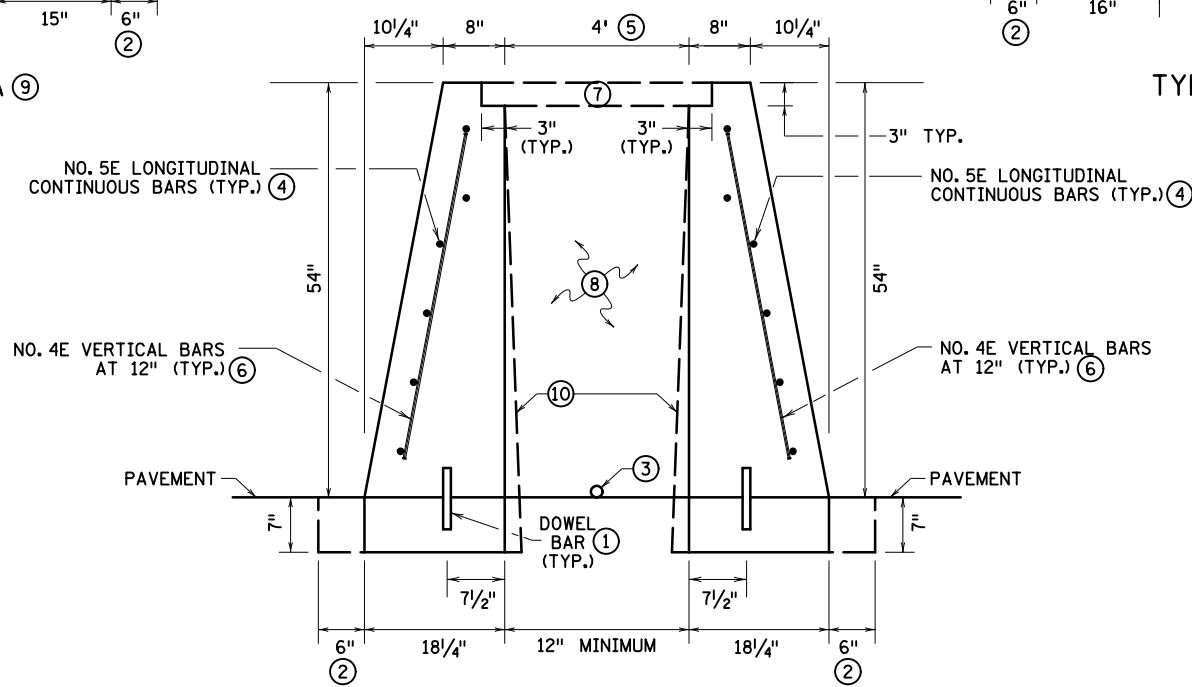
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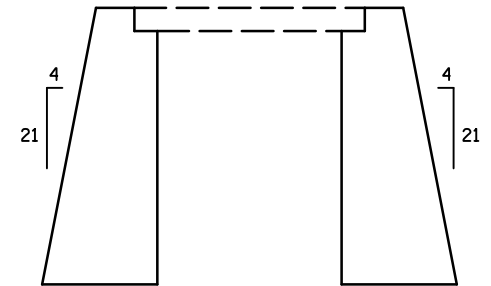
TYPE 36 A-A ⑨



TYPE 42 A-A ⑨



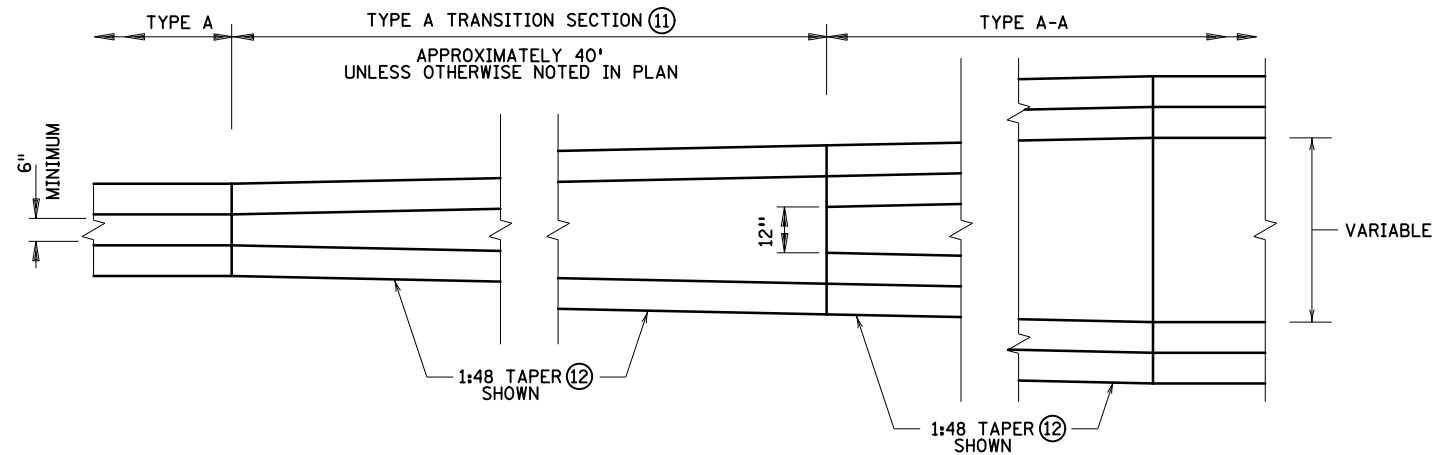
TYPE 54 A-A ⑨



BARRIER FACE SLOPE VALUE
ALL TYPE A-A BARRIERS

NOTES:

- ALL BARS EPOXY-COATED PER SPEC. 3301, UNLESS OTHERWISE NOTED.
- USE 3/4" BEVEL OR 1" RADIUS ON ALL EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED.
- DURING SLIP-FORM CONSTRUCTION, PROVIDE ALL NECESSARY SUPPORTS NEEDED TO MAINTAIN LONGITUDINAL REINFORCEMENT BARS AT SPECIFIED DIMENSIONS (INCIDENTAL).
- DURING FIXED-FORM CONSTRUCTION, MAINTAIN LONGITUDINAL REINFORCEMENT BARS AT DIMENSIONS SHOWN ON THE PLAN BY PROVIDING VERTICAL SUPPORT BARS AT 2' 0" MAXIMUM SPACING (INCIDENTAL).
- ① IF FOOTING IS CONSTRUCTED SEPARATELY, PROVIDE TWO 1" DIAMETER DOWEL BARS (OR REBAR) 8" LONG AND SPACED EVERY 2' 0" ON CENTER. PROVIDE A ROUGH TEXTURE ON SURFACE OF FOOTING.
- ② 6" ADDITIONAL FOOTING WIDTH REQUIRED WHEN CONCRETE MEDIAN BARRIER IS ADJACENT TO BITUMINOUS PAVEMENT OR BITUMINOUS SHOULDER.
- ③ WHEN REQUIRED, PROVIDE A 1/2" NOMINAL DIAMETER PVC-TYPE I CONDUIT (SPEC. 3803). LOCATE AS DIRECTED BY PLAN OR ENGINEER.
- ④ CONTINUOUS NO. 5E LONGITUDINAL REINFORCEMENT BARS REQUIRE 2 1/2" -3" CLEARANCE AND ARE EVENLY SPACED AS SHOWN IN THE DETAILS. MINIMUM LAP SPLICE IS 3' 1" FOR ALL BARS. SEE TABLE FOR BAR QUANTITIES.
- ⑤ UNLESS OTHERWISE NOTED IN PLANS.
- ⑥ NO. 4E VERTICAL BARS AT 12". SEE TABLE FOR BAR QUANTITIES. OPTIONAL FOR SLIP-FORMING CONSTRUCTION.
- ⑦ 3" CONCRETE WALK MAY BE SLOPED IF BARRIER TOPS ARE NOT THE SAME ELEVATION.
- ⑧ GRANULAR BACKFILL MATERIAL (INCIDENTAL) PER SPEC. 3149.2.D.2.
- ⑨ SHALL NOT USE ONE SIDE OF BARRIER TYPE A-A AS FREE-STANDING SYSTEM. MUST USE BOTH DETAILS AS SHOWN OR SINGLE BARRIER FULLY ABUTTED TO COMPACTED BACKFILL.
- ⑩ PERMISSIBLE IF SLIP-FORMED.
- ⑪ LONGITUDINAL CONSTRUCTION JOINTS ARE NOT ALLOWED, CONSTRUCT BARRIER TYPE A TRANSITION AS A SINGLE MONOLITHIC PIECE.
- ⑫ 1:30 OR FLATTER FLARE RATE INSIDE SHY LINE, 1:20 OR FLATTER FLARE RATE AT OR BEYOND SHY LINE, FOR 70 MPH DESIGN SPEED.



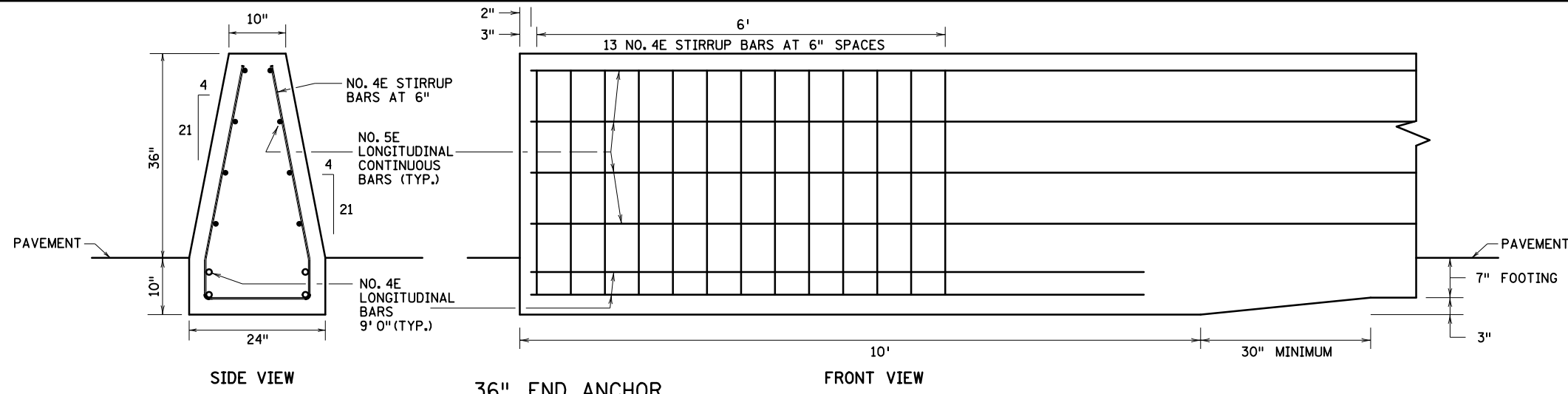
SINGLE SLOPE HORIZONTAL TRANSITION
TYPE A TO TYPE A-A

SINGLE SLOPE BARRIER BILL OF REINFORCEMENT (PER SIDE)			
BARRIER TYPE	BAR SIZE	NUMBER OF BARS EACH	NOTE
36 A-A	5E	4	LONGITUDINAL
	4E	1 @ 12"	30" VERT. AT 12"
42 A-A	5E	4	LONGITUDINAL
	4E	1 @ 12"	30" VERT. AT 12"
54 A-A	5E	6	LONGITUDINAL
	4E	1 @ 12"	44" VERT. AT 12"

REVISION:
APPROVED: APRIL 14, 2020
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STANDARD PLAN 5-297.681 3 OF 7
Tom Styrbicki
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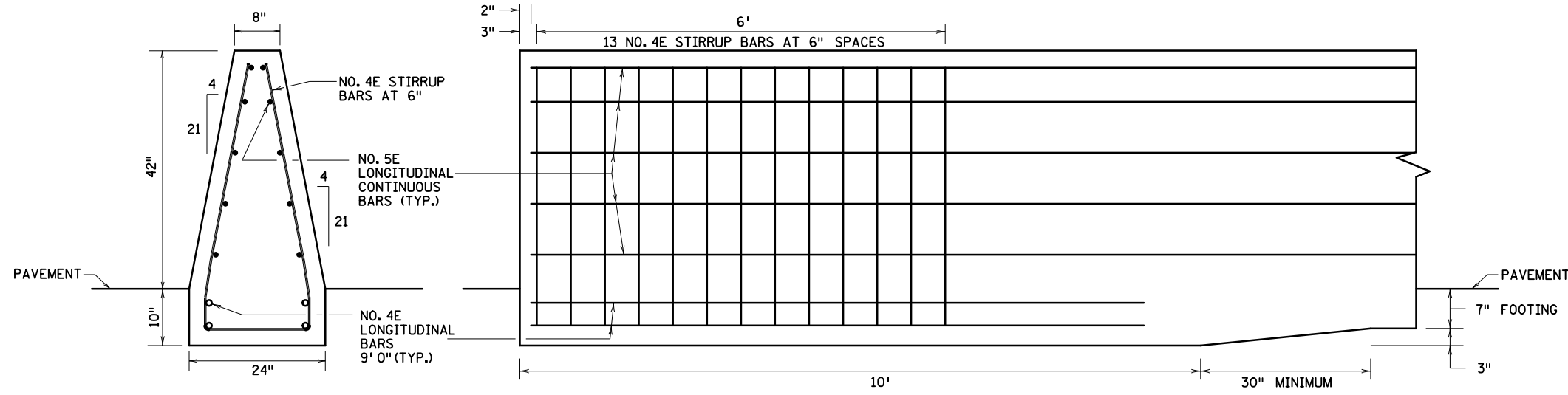
CONCRETE MEDIAN BARRIER SINGLE SLOPE
TYPE 36 A-A, TYPE 42 A-A, AND TYPE 54 A-A
(TH) SHEET NO. OF SHEETS



SIDE VIEW

36" END ANCHOR

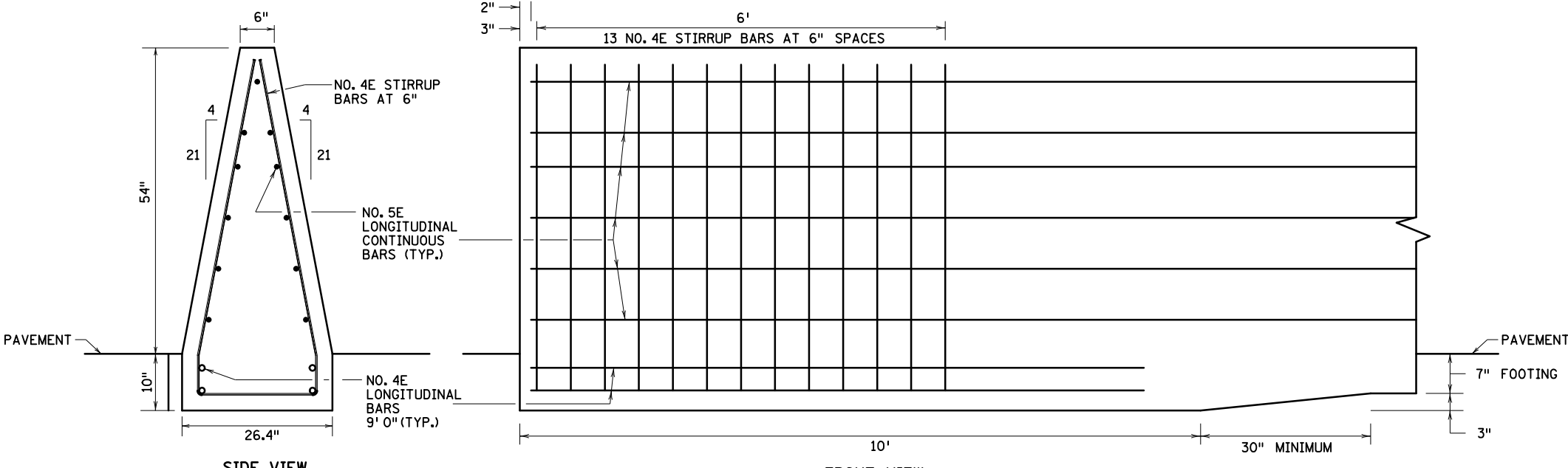
FRONT VIEW



SIDE VIEW

42" END ANCHOR

FRONT VIEW



SIDE VIEW

54" END ANCHOR

FRONT VIEW

SINGLE SLOPE BARRIER - END ANCHOR BILL OF REINFORCEMENT			
BARRIER TYPE	BAR SIZE	NUMBER OF BARS EACH	NOTE
TYPE 36	5E	8	CONTINUOUS LONG.
	4E	4	FOOTING-9' LONG.
	4E	13	FOOTING-STIRRUP 72"
TYPE 42	5E	10	CONTINUOUS LONG.
	4E	4	FOOTING-9' LONG.
	4E	13	FOOTING-STIRRUP 88"
TYPE 54	5E	11	CONTINUOUS LONG.
	4E	4	FOOTING-9' LONG.
	4E	13	FOOTING-STIRRUP 144"

NOTES:

ALL BARS EPOXY-COATED PER SPEC. 3301.

USE 3/4" CHAMFER OR 1" RADIUS ON ALL EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED.

MINIMUM LAP SPLICE IS 3' 1".

WHEN SWITCHING BETWEEN SLIP-FORM AND CAST-IN-PLACE OPERATIONS, EXTEND LONGITUDINAL REINFORCEMENT 3' BEYOND SLIP-FORMING CUT-OFF POINT. LAPS WILL BE FIRMLY TIED.

2 1/2" - 3" REINFORCEMENT CLEAR COVER TYPICAL.

COLD JOINTS MAY BE USED BETWEEN ANCHOR INSTALLATIONS. 3' OF LAP OF LONGITUDINAL REINFORCEMENT IS REQUIRED. LAPS WILL BE FIRMLY TIED.

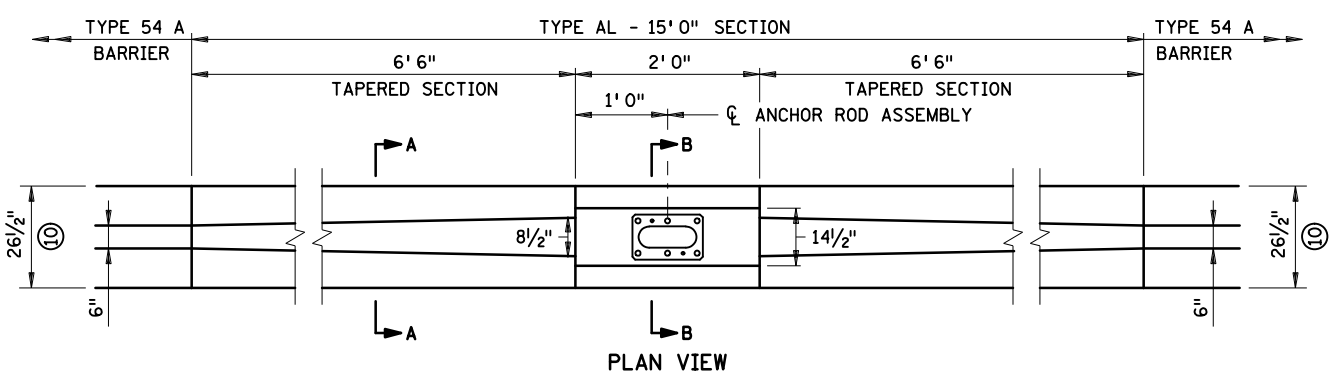
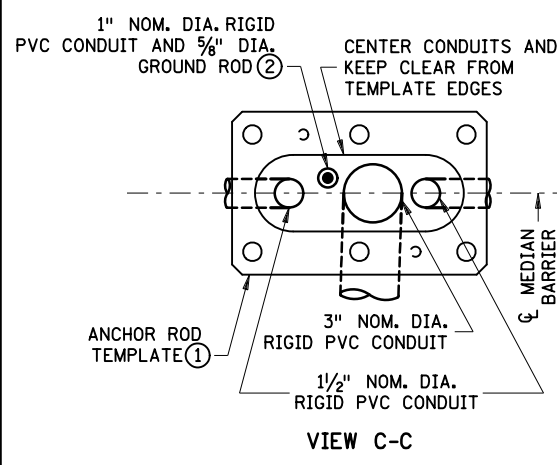
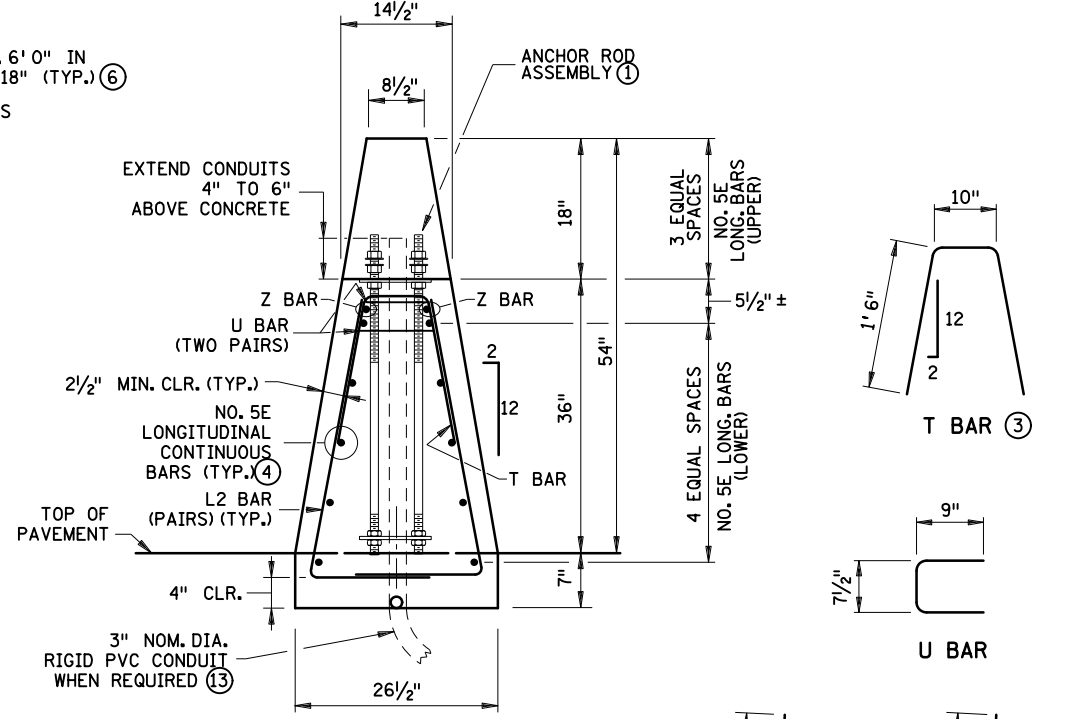
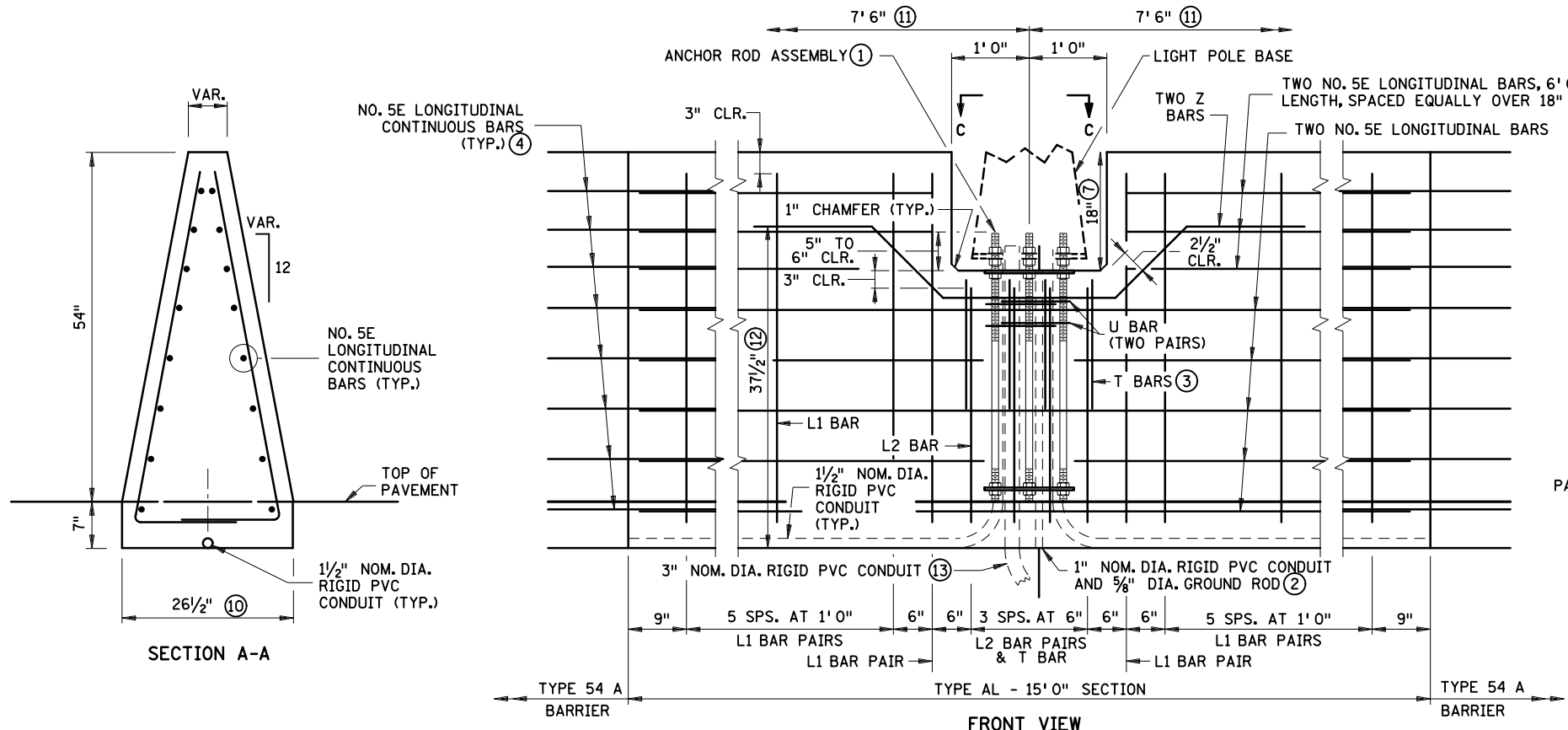
END ANCHORAGE MUST BE PLACED AT BOTH ENDS OF THE BARRIER AND AT ANY EXPANSION JOINT/OPEN JOINT. EXPANSION JOINTS SHALL BE PROVIDED IN THE BARRIERS TO MATCH EXPANSION JOINTS IN THE RIGID PAVEMENT, AT BRIDGE APPROACHES, AND AT OTHER STRUCTURES WHERE UNCONTROLLED LONGITUDINAL MOVEMENT MAY BE OBJECTIONABLE.

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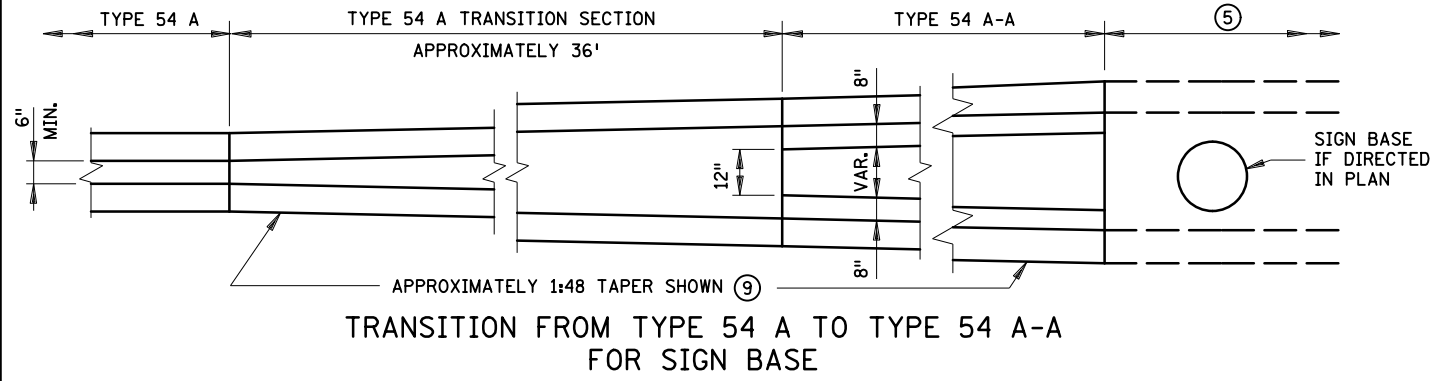


STANDARD PLAN 5-297.681 4 OF 7
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**CONCRETE MEDIAN BARRIER SINGLE SLOPE
END ANCHOR AND EXPANSION / OPEN JOINT ANCHOR**



LIGHT FOUNDATION - TYPE 54 AL (8)



TRANSITION FROM TYPE 54 A TO TYPE 54 A-A FOR SIGN BASE

TYPE AL LIGHT FOUNDATION REINFORCEMENT REQUIREMENTS				
BARRIER TYPE	BAR TYPE	BAR SIZE	BAR LENGTH	NO. PER SECTION
ALL	LONGITUDINAL - LOWER	5E	14' 6"	10
54 AL	LONGITUDINAL - UPPER	5E	6' 0"	8
42 AL	LONGITUDINAL - UPPER	5E	6' 0"	4
36 AL	LONGITUDINAL - UPPER	5E	N/A	N/A
54 AL	L1	4E	5' 10"	28
42 AL	L1	4E	4' 10"	28
36 AL	L1	4E	4' 4"	28
ALL	L2	4E	4' 4"	8
ALL	U	4E	2' 2"	4
ALL	T (3)	4E	3' 10"	4
ALL	Z	4E	6' 2"	2

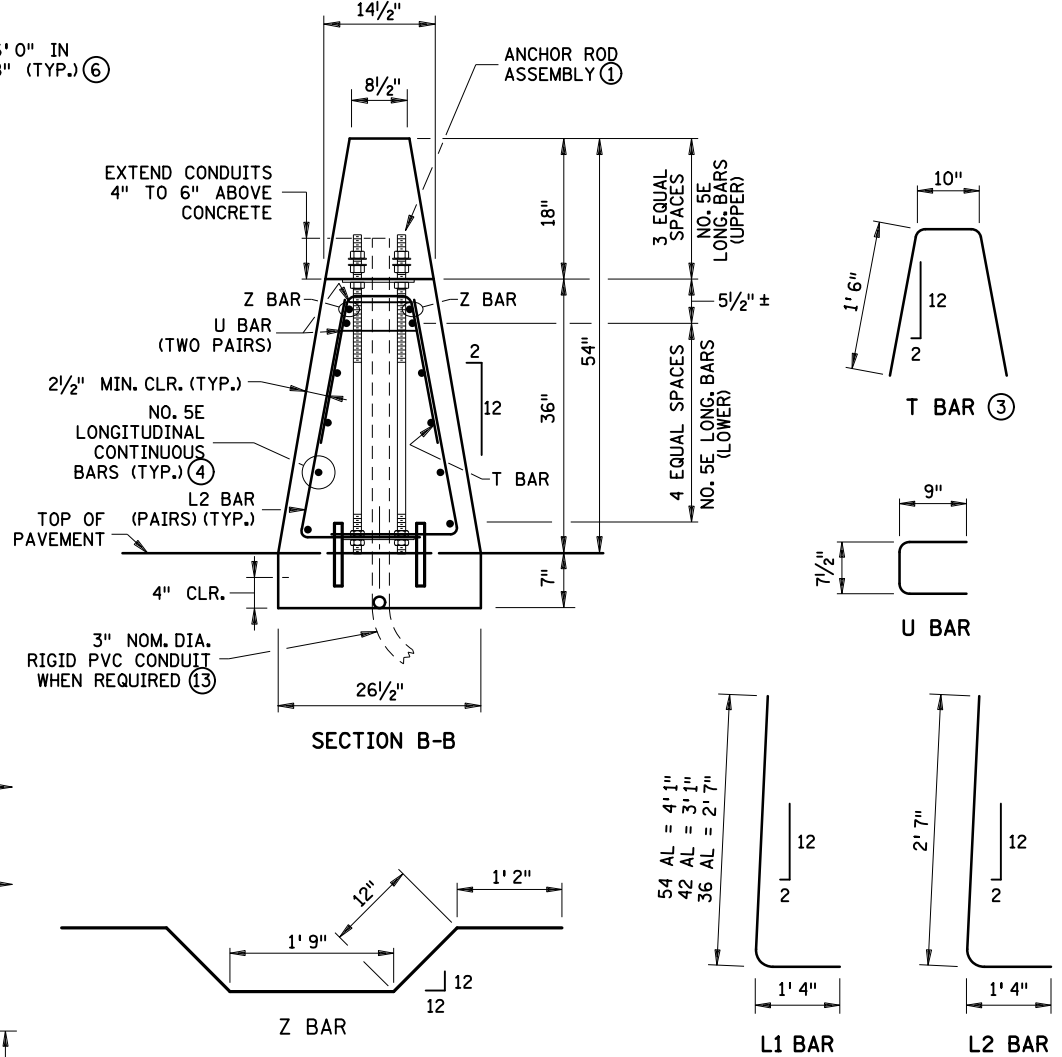
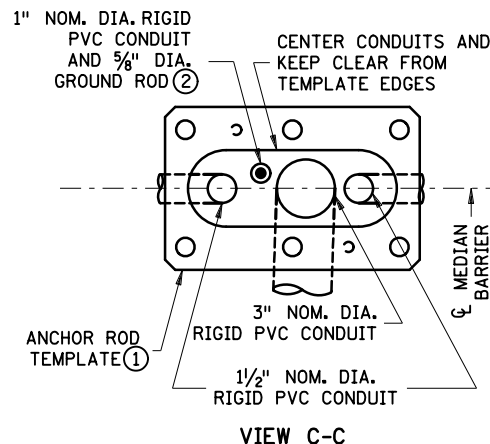
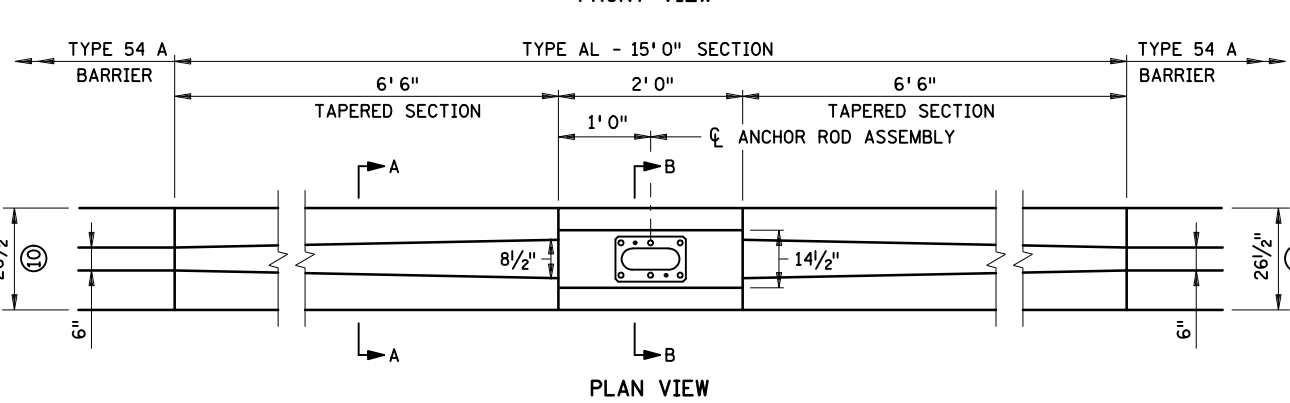
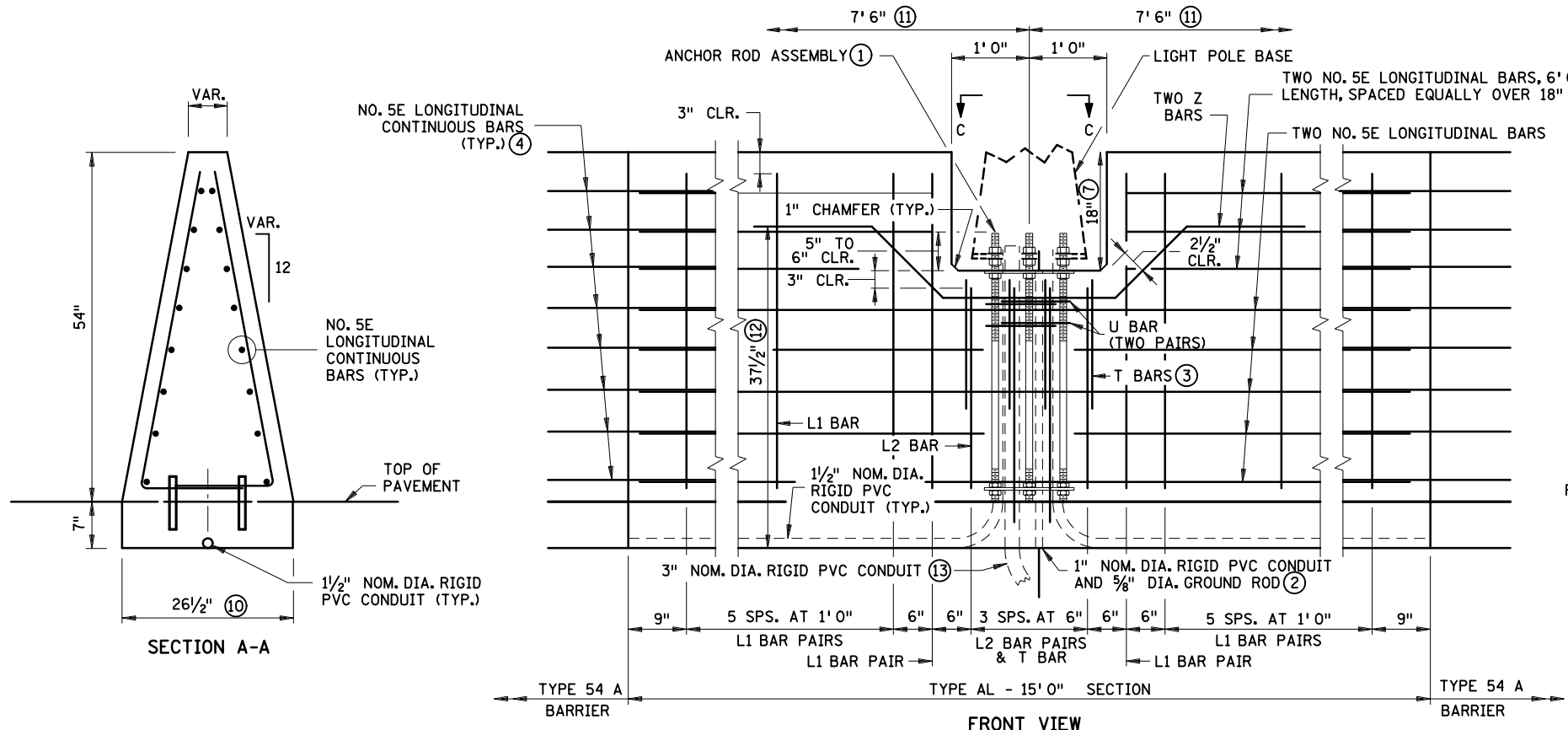
NOTES:

- USE 3/4" CHAMFER OR 1" RADIUS ON EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED. EPOXY-COAT BARS IN ACCORDANCE WITH SPEC. 3301.
- (1) REFER TO STANDARD PLATE 8332 FOR ANCHOR ROD ASSEMBLY AND TEMPLATE DETAILS.
- (2) FURNISH & INSTALL 5/8" DIA. X 15' 0" LONG GROUND ROD ELECTRODE IN 1" NOM. DIA. PVC CONDUIT (TOP OF CONDUIT FLUSH WITH TOP OF CONCRETE) OR DIRECTLY IN CONCRETE BARRIER. EXTEND THE GROUND ROD 3"-4" ABOVE THE TOP OF CONCRETE.
- (3) PAIR T BARS WITH L2 BARS AT LIGHT ANCHORAGE.
- (4) EXTEND FIVE NO. 5E LONGITUDINAL BARS 3' 4" MINIMUM INTO TYPE AL SECTION.
- (5) SEE SIGN BASE PLAN FOR DIMENSION.
- (6) FOR TYPE 42 AL, CENTER NO. 5E LONGITUDINAL BARS, 4 PER SECTION, AT 3" VERTICAL. FOR TYPE 36 AL, LONGITUDINAL BARS NOT APPLICABLE.
- (7) FOR TYPE 42 AL, DIMENSION = 6". FOR TYPE 36 AL, DIMENSION = 0".
- (8) TYPE 54 AL SHOWN. FOR OTHER TYPE AL LIGHT FOUNDATIONS, SEE TABLE FOR BAR SIZE AND QUANTITIES.
- (9) 1:30 MAXIMUM FLARE RATE INSIDE SHY LINE, 1:20 MAXIMUM FLARE RATE AT OR BEYOND SHY LINE, FOR 70 MPH DESIGN SPEED.
- (10) 24" FOR TYPE 36 A AND TYPE 42 A.
- (11) DO NOT PLACE CONTRACTION OR OTHER BARRIER JOINTS WITHIN 7' 6" FROM THE CENTER OF THE ANCHOR ROD CLUSTER.
- (12) FOR TYPE 36 AL, DIMENSION = 34".
- (13) 3" CONDUIT USED WHEN CABLES ARE CROSSING UNDER THE ROADWAY.

REVISION:
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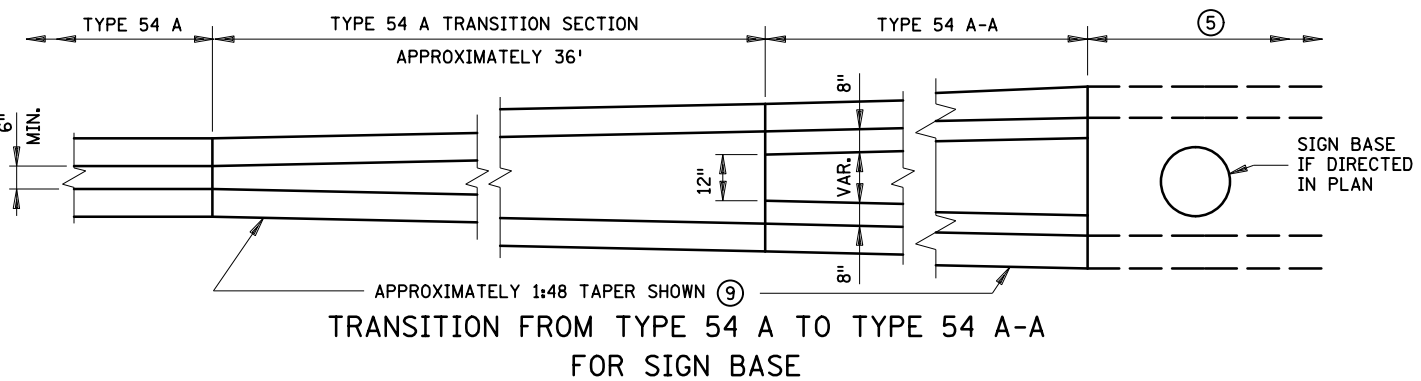
CONCRETE MEDIAN BARRIER SINGLE SLOPE
LIGHT FOUNDATION / SIGN BASE TRANSITION
MONOLITHIC BARRIER PLACEMENT
 STATE PROJ. NO. (TH) SHEET NO. OF SHEETS



LIGHT FOUNDATION - TYPE 54 AL (8)

TYPE AL LIGHT FOUNDATION REINFORCEMENT REQUIREMENTS				
BARRIER TYPE	BAR TYPE	BAR SIZE	BAR LENGTH	NO. PER SECTION
ALL	LONGITUDINAL - LOWER	5E	14' 6"	10
54 AL	LONGITUDINAL - UPPER	5E	6' 0"	8
42 AL	LONGITUDINAL - UPPER	5E	6' 0"	4
36 AL	LONGITUDINAL - UPPER	5E	N/A	N/A
54 AL	L1	4E	5' 5"	28
42 AL	L1	4E	4' 5"	28
36 AL	L1	4E	3' 11"	28
ALL	L2	4E	3' 11"	8
ALL	U	4E	2' 2"	4
ALL	T (3)	4E	3' 10"	4
ALL	Z	4E	6' 2"	2

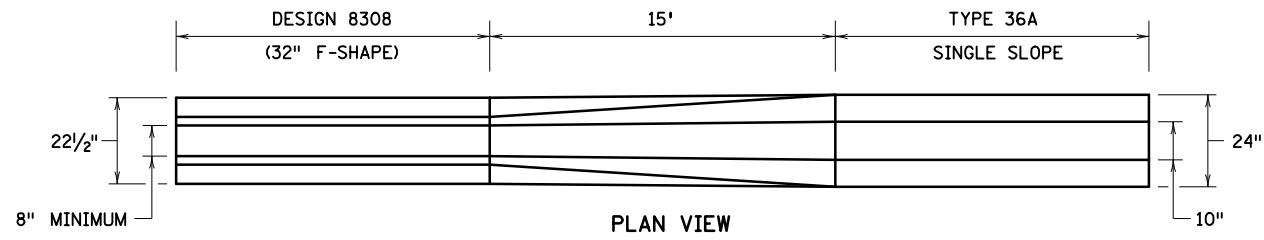
- NOTES:**
- USE 3/4" CHAMFER OR 1" RADIUS ON EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED. EPOXY-COAT BARS IN ACCORDANCE WITH SPEC. 3301.
 - (1) REFER TO STANDARD PLATE 8332 FOR ANCHOR ROD ASSEMBLY AND TEMPLATE DETAILS.
 - (2) FURNISH & INSTALL 5/8" DIA. X 15' 0" LONG GROUND ROD ELECTRODE IN 1" NOM. DIA. PVC CONDUIT (TOP OF CONDUIT FLUSH WITH TOP OF CONCRETE) OR DIRECTLY IN CONCRETE BARRIER. EXTEND THE GROUND ROD 3"-4" ABOVE THE TOP OF CONCRETE.
 - (3) PAIR T BARS WITH L2 BARS AT LIGHT ANCHORAGE.
 - (4) EXTEND FIVE NO. 5E LONGITUDINAL BARS 3' 4" MINIMUM INTO TYPE AL SECTION.
 - (5) SEE SIGN BASE PLAN FOR DIMENSION.
 - (6) FOR TYPE 42 AL, CENTER NO. 5E LONGITUDINAL BARS, 4 PER SECTION, AT 3" VERTICAL. FOR TYPE 36 AL, LONGITUDINAL BARS NOT APPLICABLE.
 - (7) FOR TYPE 42 AL, DIMENSION = 6". FOR TYPE 36 AL, DIMENSION = 0".
 - (8) TYPE 54 AL SHOWN. FOR OTHER TYPE AL LIGHT FOUNDATIONS, SEE TABLE FOR BAR SIZE AND QUANTITIES.
 - (9) 1:30 MAXIMUM FLARE RATE INSIDE SHY LINE, 1:20 MAXIMUM FLARE RATE AT OR BEYOND SHY LINE, FOR 70 MPH DESIGN SPEED.
 - (10) 24" FOR TYPE 36 A AND TYPE 42 A.
 - (11) DO NOT PLACE CONTRACTION OR OTHER BARRIER JOINTS WITHIN 7' 6" FROM THE CENTER OF THE ANCHOR ROD CLUSTER.
 - (12) FOR TYPE 36 AL, DIMENSION = 34".
 - (13) 3" CONDUIT USED WHEN CABLES ARE CROSSING UNDER THE ROADWAY.



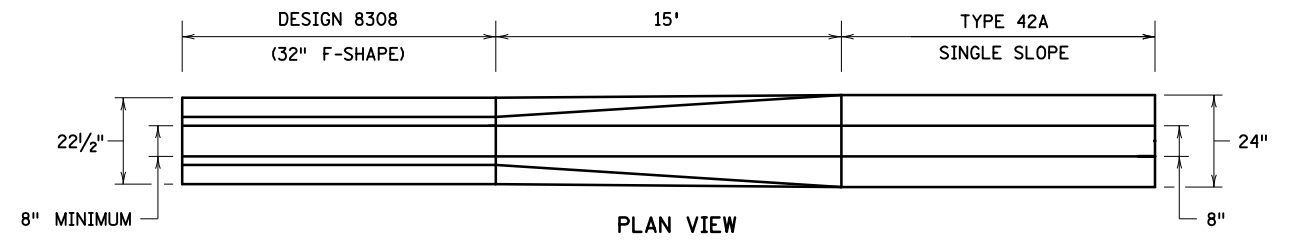
REVISION:
 APPROVED: APRIL 14, 2020
Kevin Western
 KEVIN WESTERN
 STATE BRIDGE ENGINEER

m MINNESOTA
 DEPARTMENT OF TRANSPORTATION
 STANDARD PLAN 5-297.681 6 OF 7
 APPROVED: 4-14-2020
 REVISED:
Tom Styrbicki
 THOMAS STYRBICKI
 STATE DESIGN ENGINEER

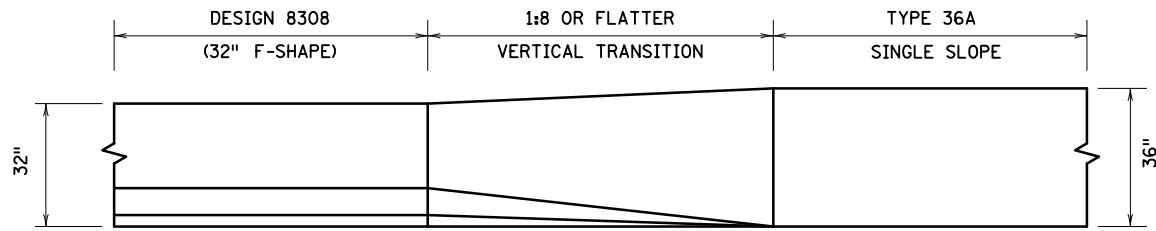
**CONCRETE MEDIAN BARRIER SINGLE SLOPE
 LIGHT FOUNDATION / SIGN BASE TRANSITION
 BARRIER ON FOOTING**
 STATE PROJ. NO. (TH) SHEET NO. OF SHEETS



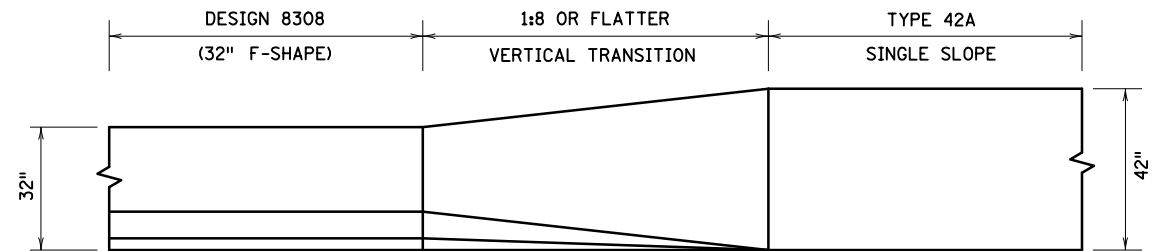
PLAN VIEW



PLAN VIEW



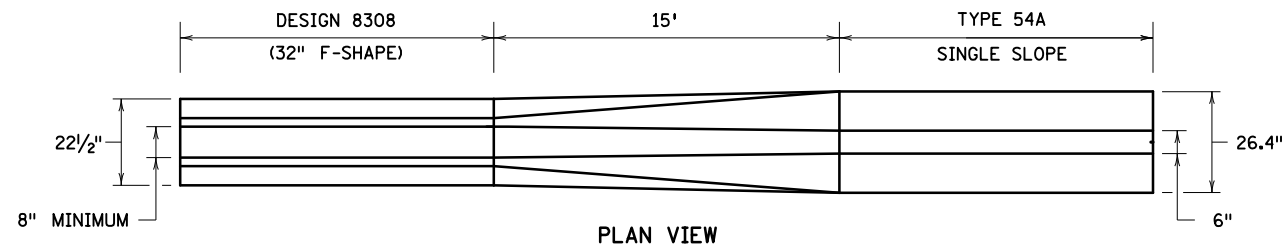
SIDE VIEW



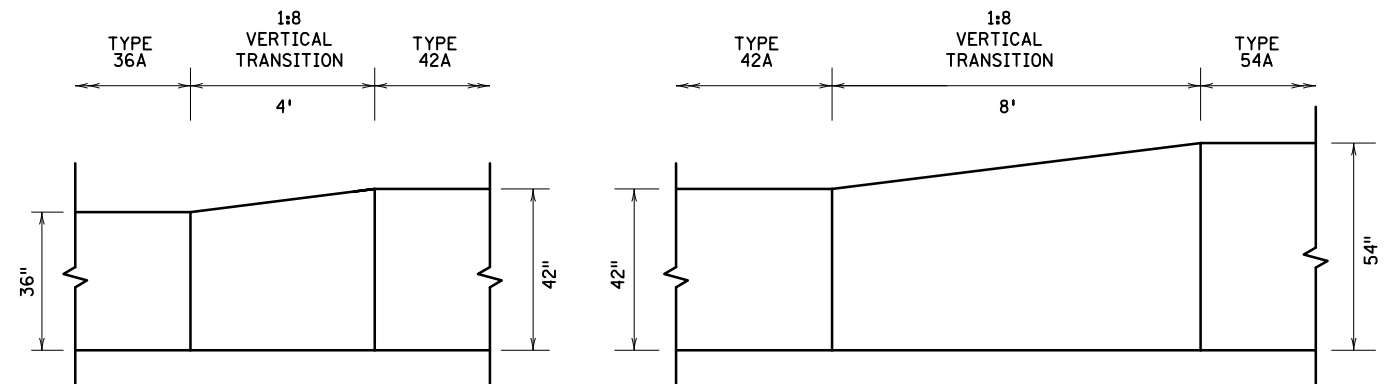
SIDE VIEW

TYPE 36 TRANSITION
DESIGN 8308 (32" F-SHAPE) TRANSITION TO TYPE 36 SINGLE SLOPE

TYPE 42 TRANSITION
DESIGN 8308 (32" F-SHAPE) TRANSITION TO TYPE 42 SINGLE SLOPE

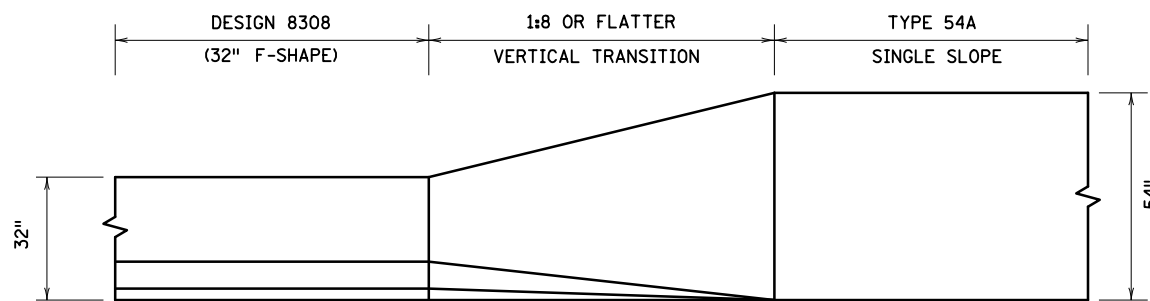


PLAN VIEW



PROFILE VIEW

SINGLE SLOPE VERTICAL TRANSITION



SIDE VIEW

TYPE 54 TRANSITION
DESIGN 8308 (32" F-SHAPE) TRANSITION TO TYPE 54 SINGLE SLOPE

NOTES:

ALL BARRIERS (F-TYPE, J-TYPE, G-TYPE) SHALL TRANSITION TO SINGLE SLOPE BARRIER WITH A 15' VERTICAL TRANSITION SECTION. VERTICAL SLOPE SHALL BE 1:8 OR FLATTER.

REVISION:
APPROVED: APRIL 14, 2020
Kevin Western
KEVIN WESTERN
STATE BRIDGE ENGINEER

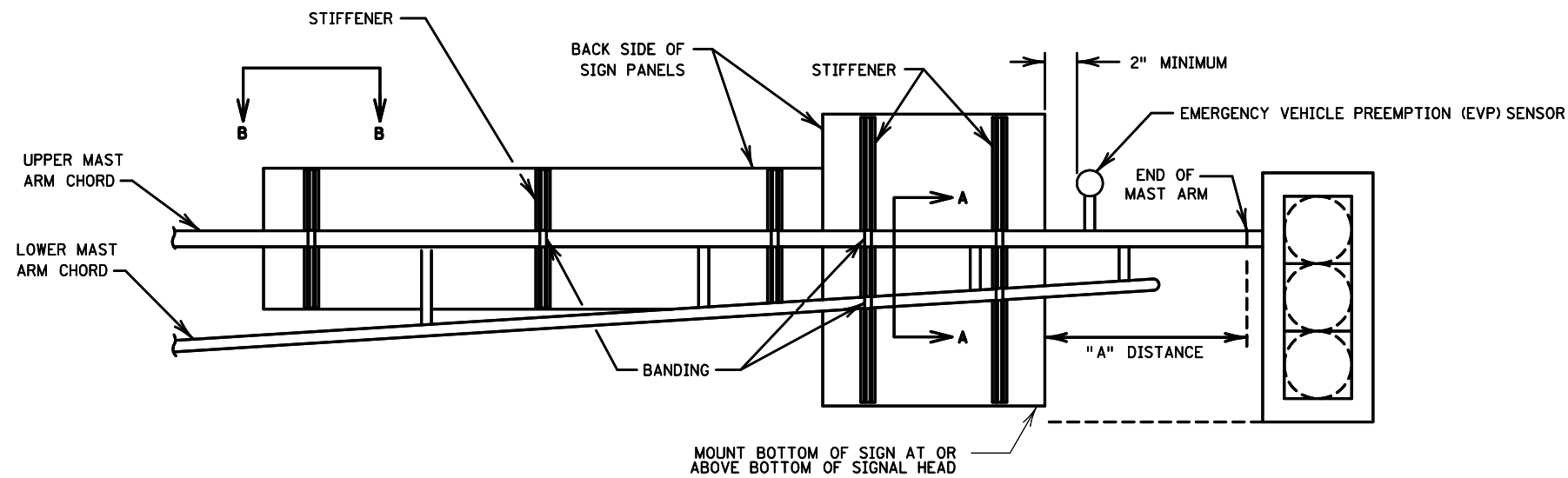


STANDARD PLAN 5-297.681 7 OF 7
Tom Styrbicki
THOMAS STYRBICKI
STATE DESIGN ENGINEER
APPROVED: 4-14-2020
REVISED:

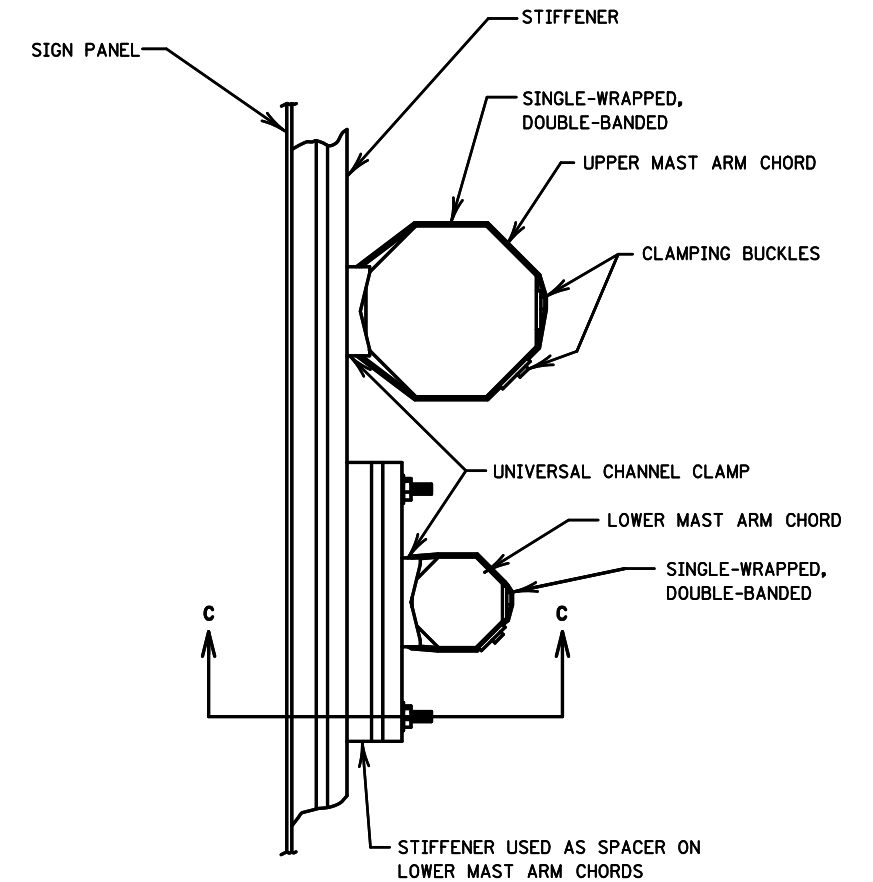
CONCRETE MEDIAN BARRIER SINGLE SLOPE
TYPE F BARRIER TRANSITIONS
SINGLE SLOPE VERTICAL TRANSITIONS

STATE PROJ. NO. (TH) SHEET NO. OF SHEETS

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MAST ARM SIGN MOUNTING



VIEW A-A ①

① SIGN PANELS TALLER THAN 36" MUST BE BANDED TO THE LOWER MAST ARM CHORD AT A MINIMUM OF ONE LOCATION. SIGN PANEL SHALL BE BANDED TO THE LOWER MAST ARM AT A LOCATION THAT WILL PROVIDE THE CLOSEST TO PLUMB ALIGNMENT FOR THE SIGN PANEL.

		NUMBER OF EXTRUDED STIFFENERS REQUIRED*													
		PANEL WIDTH													
PANEL HEIGHT		2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	
		2'	2	2	2	3	3	3	4	4	4	5	5	5	5
	3'	2	2	2	3	3	3	4	4	5	5	5	5	5	
	4'	2	2	2	3	3	3	4	4	5	5	5	5	6	
	5'	2	2	2	3	4	4	5	5	5	5	5	5	6	
	6'		2	3	4	4	5	5	5	5	5	5	5	6	
	7'			4	4	5	5	5	5	5	5	5	5	6	

* WHERE SIGN PANEL DIMENSIONS FALL BETWEEN 1' INCREMENTS, USE NEXT HIGHER WIDTH AND/OR HEIGHT DIMENSION.

NOTES:

FURNISH AND INSTALL AT LEAST ONE SPACER FOR EACH SIGN PANEL WHEN PANELS ARE ATTACHED TO THE LOWER MAST ARM CHORD.

AFFIX SIGNS TO UPPER AND LOWER MAST ARM CHORDS WHEN POSSIBLE.

POSITION BOTTOM OF SIGN PANEL AT LEAST 17' ABOVE ROADWAY.

MOUNT SIGN PANELS PLUMB AND SHIM WITH REQUIRED SPACERS AS SHOWN.

PROVIDE SPACING BETWEEN STIFFENERS OF NO MORE THAN 36".

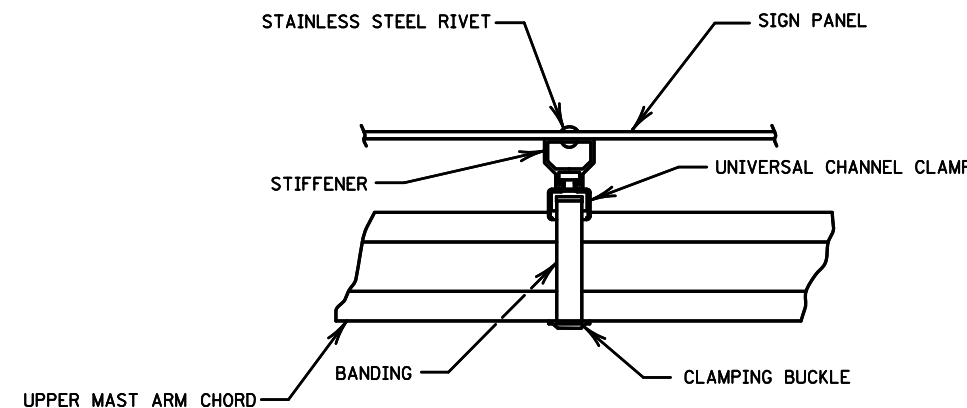
PROVIDE A HORIZONTAL DISTANCE OF NO MORE THAN 12" FROM PANEL EDGE TO STIFFENER.

PROVIDE A VERTICAL DISTANCE OF NO MORE THAN 1" FROM PANEL EDGE TO STIFFENER.

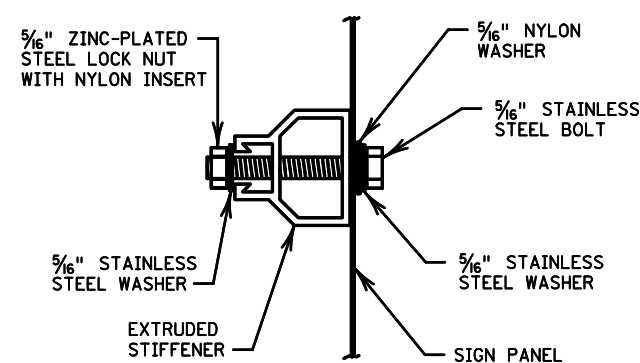
FURNISH AND INSTALL 1/4" STAINLESS STEEL RIVETS 3" FROM THE PANEL EDGE TO ATTACH THE STIFFENERS TO THE SIGN PANELS. FURNISH AND INSTALL 3/16" STAINLESS STEEL RIVETS AT 6" ON CENTER TO ATTACH THE REMAINDER OF THE STIFFENER TO THE SIGN PANEL.

FURNISH TWO TYPE 201 STAINLESS STEEL 3/4" WIDE BY 1/32" THICK STRAPS, EACH WITH CLAMPING BUCKLES AND INSTALL SEPARATELY WITH A SINGLE WRAP AROUND THE MAST ARM CHORD. PLACE THE SECOND BANDING STRAP OVER THE FIRST STRAP AND STAGGER THE CLAMPING BUCKLES SO THE BUCKLES ARE NOT DIRECTLY OVER ONE ANOTHER.

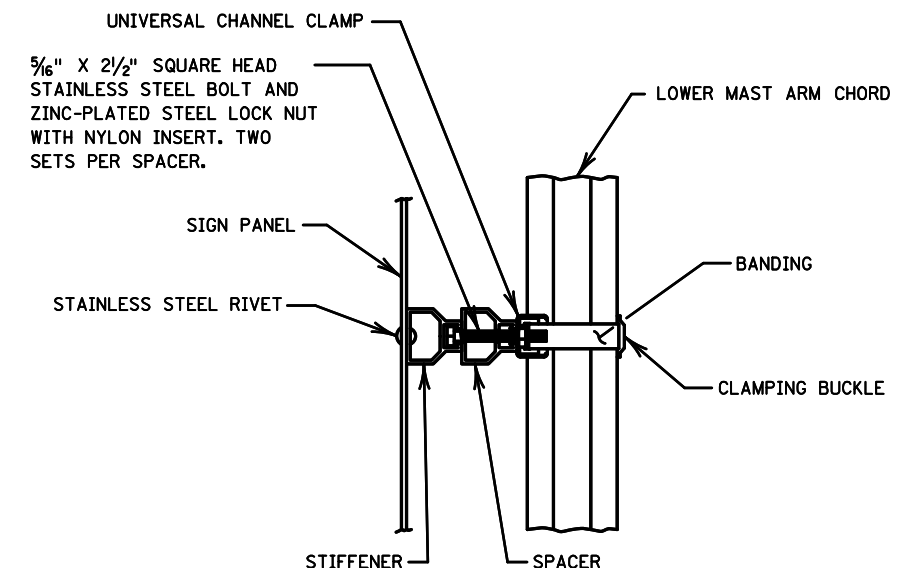
THE "A" DISTANCE IS SHOWN ON THE PLANS. IT IS THE DISTANCE FROM THE END OF THE MAST ARM TO THE EDGE OF EACH SIGN.



VIEW B-B



BOLT ATTACHMENT
ATTACH AT STANDARD PUNCH CODE LOCATIONS



VIEW C-C

REVISION: APRIL 17, 2020

APPROVED: OCTOBER 16, 2019

Brian Suberson
BRIAN SUBERSON
STATE TRAFFIC ENGINEER



STANDARD PLAN 5-297.731

1 OF 1

Peter A. Harff
PETER A. HARFF
STATE DESIGN ENGINEER

APPROVED: 10-16-2019
REVISED: 4-17-2020

STATE PROJ. NO.

SIGN MOUNTING DETAILS
FOR SIGNAL MAST ARMS

(TH) SHEET NO. OF SHEETS

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