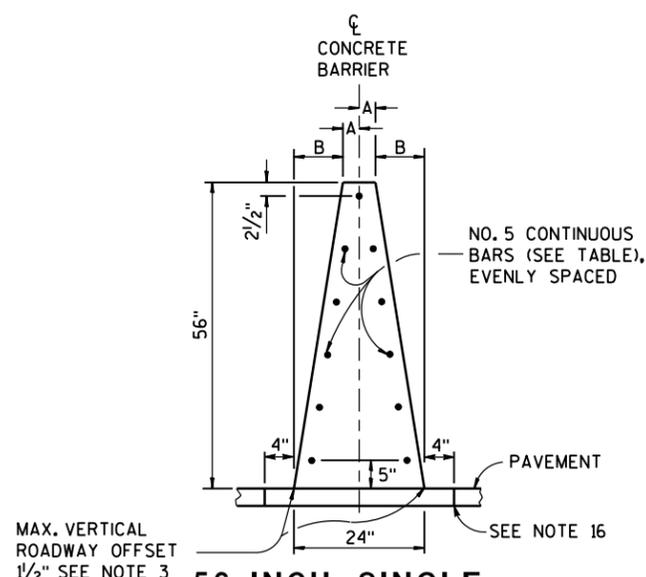
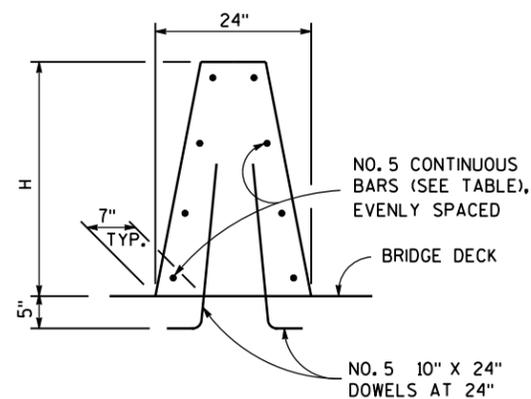


32-INCH, 36-INCH OR 42-INCH SINGLE SLOPE CONCRETE BARRIER (TYPE S32, TYPE S36, AND TYPE S42)



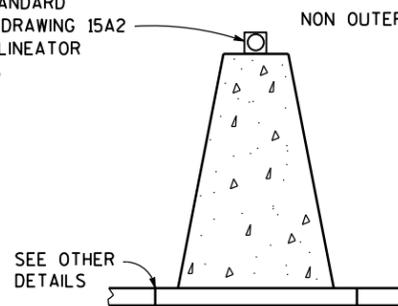
56-INCH SINGLE SLOPE CONCRETE BARRIER (TYPE S56)



SINGLE SLOPE CONCRETE BARRIER ON BRIDGE

BARRIER HEIGHT H INCHES	A INCHES	B INCHES	NUMBER OF NO. 5 BARS EACH
32	7	5	8
36	6 1/4	5 3/4	8
42	5 1/4	6 3/4	10
56	3	9	11

SEE STANDARD DETAIL DRAWING 15A2 FOR DELINEATOR DETAILS



DELINEATION

14. IN TYPE S32, TYPE S36, TYPE S42 AND TYPE S56 DEPTH OF FOOTING 10". IN TYPE S32A, TYPE S36A, TYPE S42A AND TYPE S56A MATCH TOTAL HEIGHT OF SINGLE SLOPE BARRIER RETAINING WALL.
15. FOR ALL BARRIER TYPES SHOWN, ANCHOR IS REQUIRED AT CONCRETE BARRIER ENDS AND AT INTERRUPTIONS IN CONCRETE BARRIER. ANCHOR MAY BE AS SHOWN ON DRAWING OR DETAILS SHOWN ON S.D.D. 14B33. ANCHORS INCIDENTAL TO CBSS.
16. CONCRETE PAD UNDER CBSS MAY BE PLACED INTEGRAL WITH BARRIER, PLACED SEPARATELY OR PLACED WITH CONCRETE SHOULDER AND SAWED FULL DEPTH. CONCRETE PAD MINIMUM DEPTH IS 6 INCHES, OR EQUAL TO THE DEPTH OF THE CONCRETE SHOULDER.

GENERAL NOTES

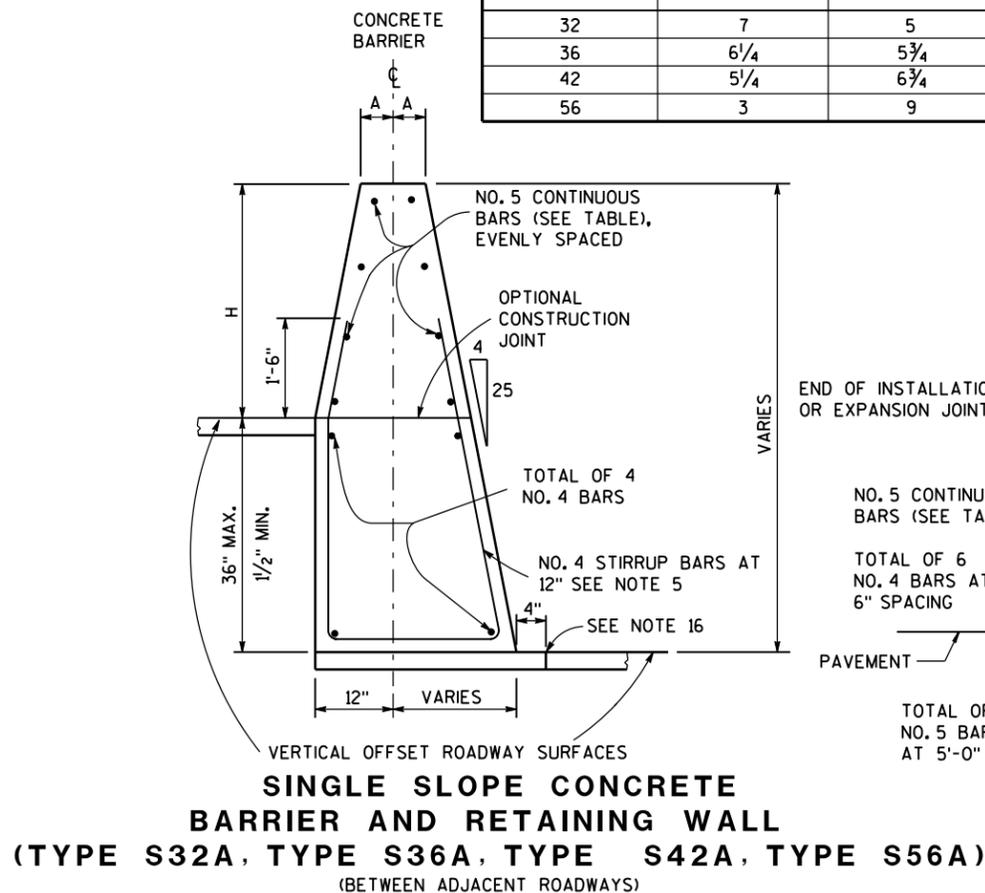
1. WHERE THE CONCRETE BARRIER IS ADDED TO THE FACE OF EXISTING CONCRETE STRUCTURE, MATCH EXISTING WEEP HOLES.
2. EXPANSION JOINTS IN CONCRETE BARRIER SHALL BE LOCATED AT ALL DECK, AND PRINCIPAL WALL JOINTS. EXPANSION JOINT FILLER MATERIAL SHALL BE THE SAME SIZE AS JOINT OR 1/2" MINIMUM.
3. WHERE VERTICAL ROADWAY OFFSET IS GREATER THAN 1/2", USE TYPE A
4. PLACE BARRIER PERPENDICULAR TO SHOULDER GRADE, UNLESS INDICATED IN PLAN.
5. EXCEPT IN ANCHORS, VERTICAL REINFORCING STIRRUP NOT REQUIRED FOR ROADWAY OFFSETS LESS THAN 1'-0".
6. FOR TYPE S32, TYPE S36, TYPE S42, AND S56 MONOLITHIC FOOTING OR DOWELED FOOTING WITH 2-*8 x 8" @ 2'-0".
7. STAGGER LAPPING OF LONGITUDINAL STEEL. MINIMUM OVERLAP OF STEEL 2 FEET. BARS AT LAPS TO BE FIRMLY TIED OR CONNECTED.
8. 4000 PSI CONCRETE AIR ENTRAINMENT PER STANDARD SPECIFICATION 501.
9. WHEN SWITCHING BETWEEN SLIP FORM AND CAST-IN-PLACE OPERATIONS, EXTEND LONGITUDINAL STEEL 3 FEET BEYOND SLIP-FORMING CUT OFF POINT. EXPOSED STEEL INTO NEXT POURS REINFORCEMENT. LAPS TO BE FIRMLY TIED.
10. USE 3/4" BEVEL OR 1" RADIUS ON ALL EXPOSED SHARP EDGES UNLESS OTHERWISE NOTED.
11. 2" CLEAR COVER TYPICAL.
12. COLD-JOINTS MAY BE USED BETWEEN ANCHOR INSTALLATIONS. WHEN A COLD JOINT IS NEEDED, 3 FEET OF LAP OF LONGITUDINAL STEEL IS REQUIRED. LAPS TO BE FIRMLY TIED.
13. IN TYPE S32, TYPE S36, TYPE S42 AND TYPE S56 NO ADDITIONAL VERTICAL STEEL NEEDED. IN TYPE S32A, TYPE S36A, TYPE S42A AND TYPE S56A REQUIRES VERTICAL STEEL. SEE OTHER DETAIL.

DELINEATOR SPACING ON HORIZONTAL CURVES

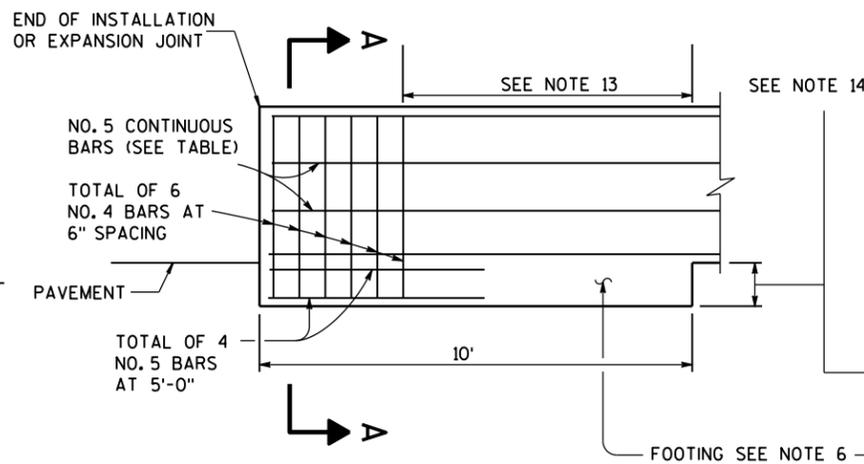
RADIUS OF CURVE	APPROXIMATE SPACING ON CURVE
50 FEET	20 FEET
115 FEET	25 FEET
180 FEET	35 FEET
250 FEET	40 FEET
300 FEET	50 FEET
400 FEET	55 FEET
500 FEET	65 FEET
600 FEET	70 FEET
700 FEET	75 FEET
800 FEET	80 FEET
900 FEET	85 FEET
1000 FEET	90 FEET

DELINEATOR SPACING ON RADIUS GREATER THAN 1000 FEET OR TANGENT SECTIONS

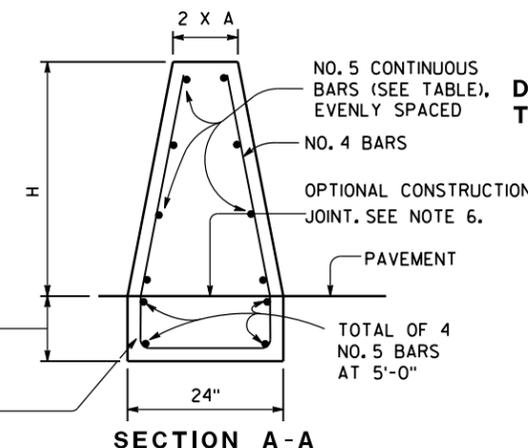
	LENGTH OF BARRIER	REFLECTOR SPACING	NO. SURFACES REFLECTORIZED	MIN. NO. REFLECTORS
ONE WAY TRAFFIC	< 200'	50' C-C	1	3
	> 200'	100' C-C	1	
TWO WAY TRAFFIC	< 200'	25' C-C	1	6
	> 200'	50' C-C	1	
TWO WAY TRAFFIC	< 200'	50' C-C	2	3
	> 200'	100' C-C	2	



SINGLE SLOPE CONCRETE BARRIER AND RETAINING WALL (TYPE S32A, TYPE S36A, TYPE S42A, TYPE S56A) (BETWEEN ADJACENT ROADWAYS)



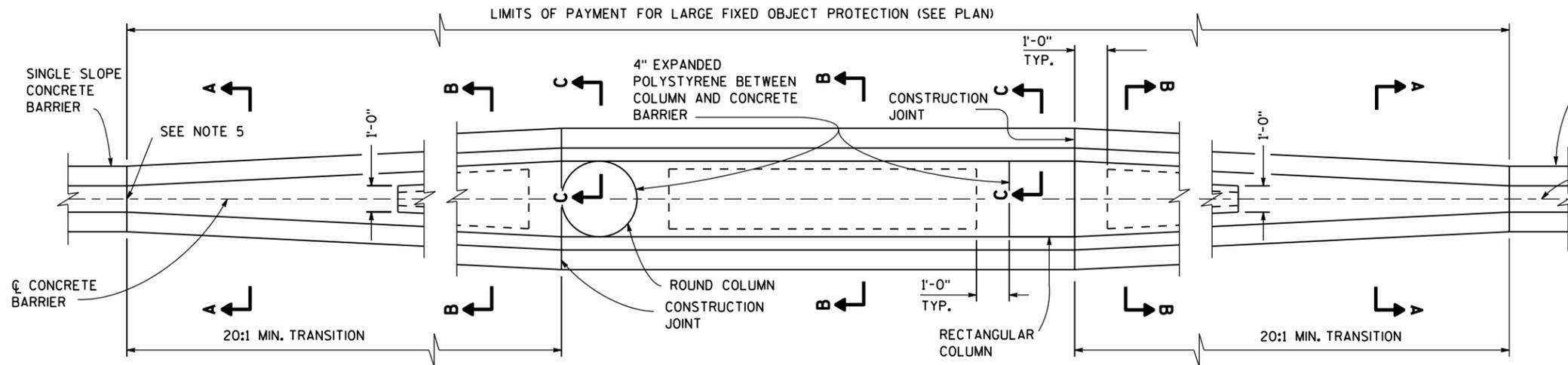
END ANCHOR SINGLE SLOPE CONCRETE BARRIER AT CONSTRUCTION JOINT



SECTION A-A

CONCRETE BARRIER SINGLE SLOPE (CBSS)

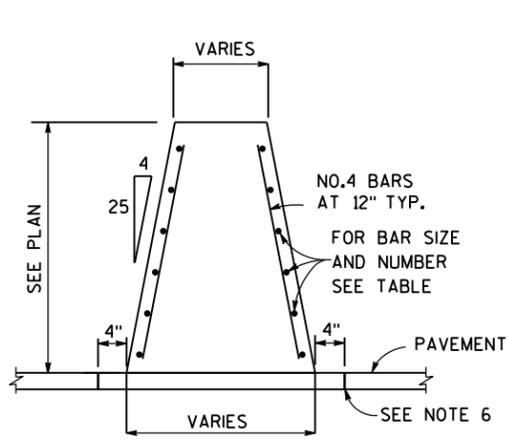
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION



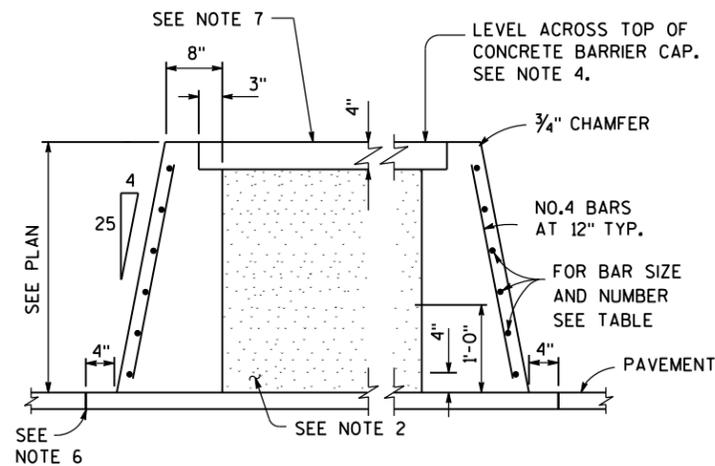
LARGE FIXED OBJECTS PROTECTION
 TYPE S32, TYPE S36, TYPE S42, TYPE S56

GENERAL NOTES

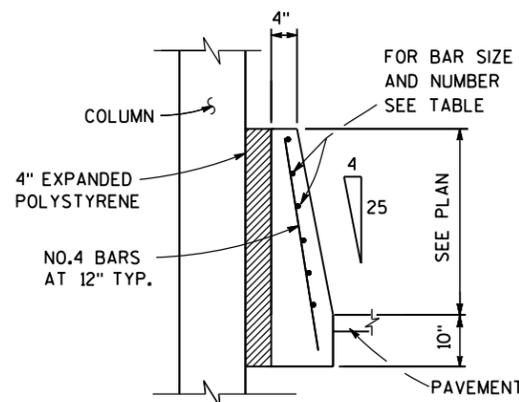
1. INSTALL 1-INCH DIAMETER DRAIN PIPE EVERY 20 FEET OF CROSS SECTION B-B. MINIMUM 1 DRAIN PER CAVITY.
2. BETWEEN CONCRETE BARRIER WALLS FILL WITH FOUNDATION BACKFILL.
3. REINFORCING STEEL SHALL EXTEND CONTINUOUS THROUGH CONSTRUCTION JOINTS.
4. ADJUST HEIGHT OF CONCRETE BARRIER WALL ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF CONCRETE CAP.
5. IF FIXED OBJECT PROTECTION IS INSTALLED FIRST, USE COLD JOINTS. IF CBSS PLACED FIRST, USE EXPANSION JOINT.
6. CONCRETE PAD UNDER CBSS MAY BE PLACED INTEGRAL WITH BARRIER, PLACED SEPARATELY OR PLACED WITH CONCRETE SHOULDER AND SAWED FULL DEPTH. SAWING OF CONCRETE SHOULDER IS INCIDENTAL TO CONCRETE BARRIER BID ITEM. CONCRETE PAD MINIMUM DEPTH IS 6 INCHES, OR EQUAL TO THE DEPTH OF THE CONCRETE SHOULDER.
7. USE NO. 3 BAR SPACED 12 INCHES CENTER TO CENTER (PLACED IN EACH DIRECTION) OR EQUIVALENT WIRE MESH.



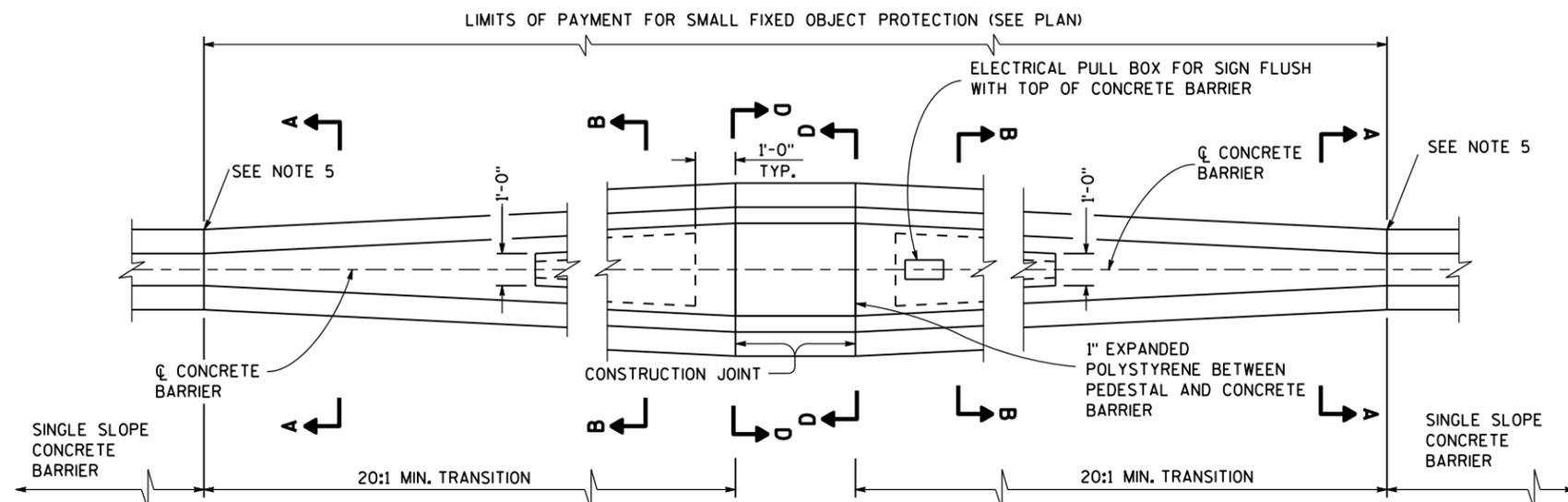
SECTION A-A



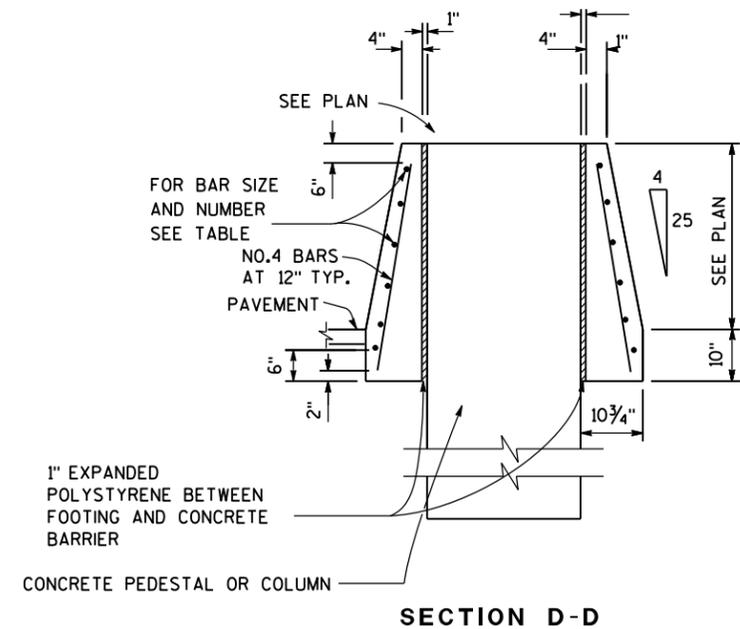
SECTION B-B



SECTION C-C



SMALL FIXED OBJECTS PROTECTION
 TYPE S32, TYPE S36, TYPE S42, TYPE S56



SECTION D-D

BARRIER HEIGHT H INCHES	BAR SIZE	NUMBER OF BARS EACH
32	4	6
36	4	6
42	5	6
56	5	9

CONCRETE BARRIER SINGLE SLOPE (CBSS)

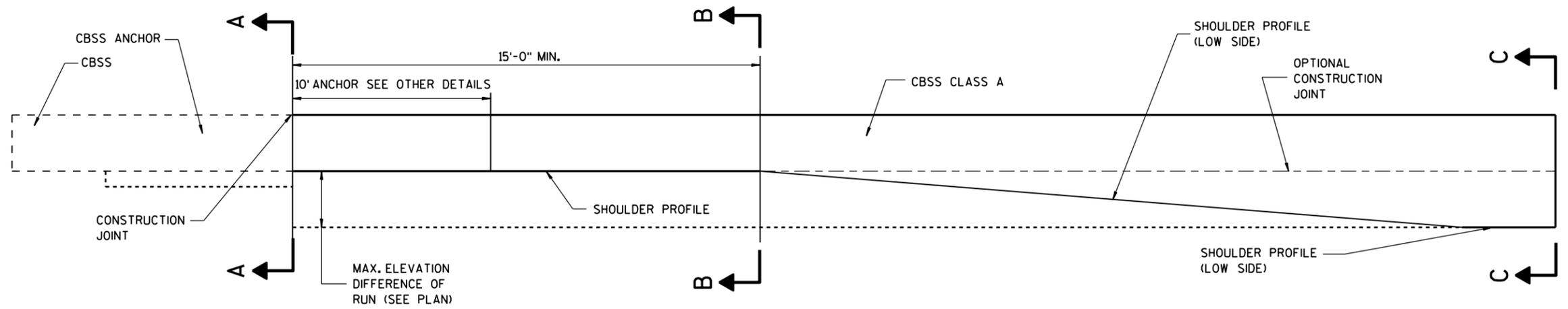
STATE OF WISCONSIN
 DEPARTMENT OF TRANSPORTATION

6

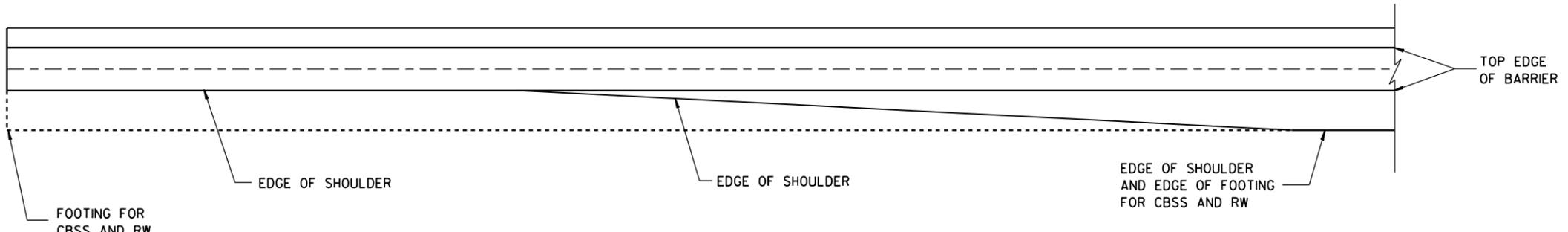
6

S.D.D. 14 B 32-4b

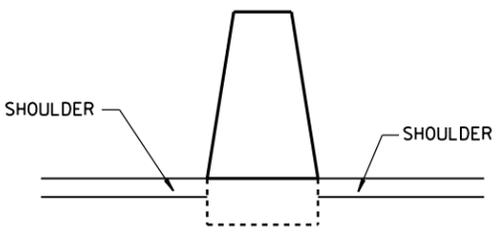
S.D.D. 14 B 32-4b



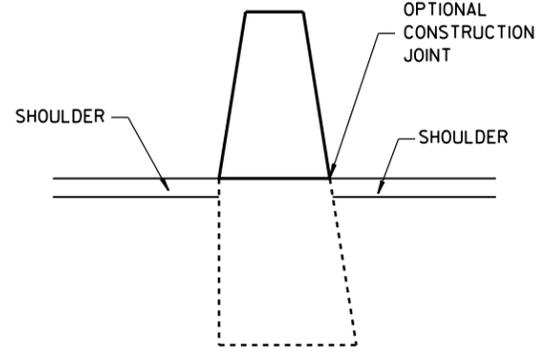
**ELEVATION VIEW
TRANSITION TO CBSS CLASS A
(TYPE S32A, TYPE S36A, TYPE S42A, TYPE S56A)**



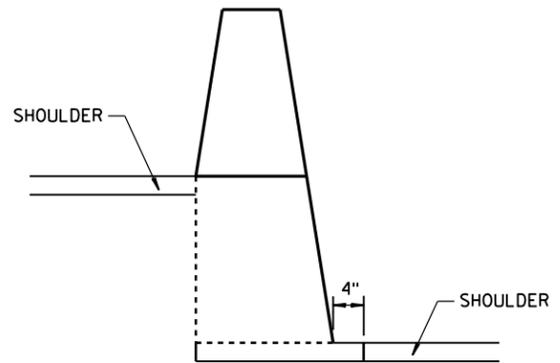
**PLAN VIEW
TRANSITION TO CBSS CLASS A
(TYPE S32A, TYPE S36A, TYPE S42A, TYPE S56A)**



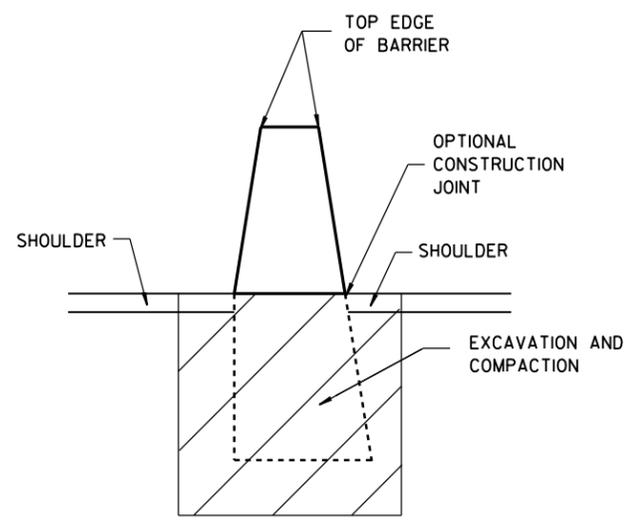
SECTION A-A



SECTION B-B



SECTION C-C



**CONCRETE BARRIER SINGLE SLOPE
(CBSS)**

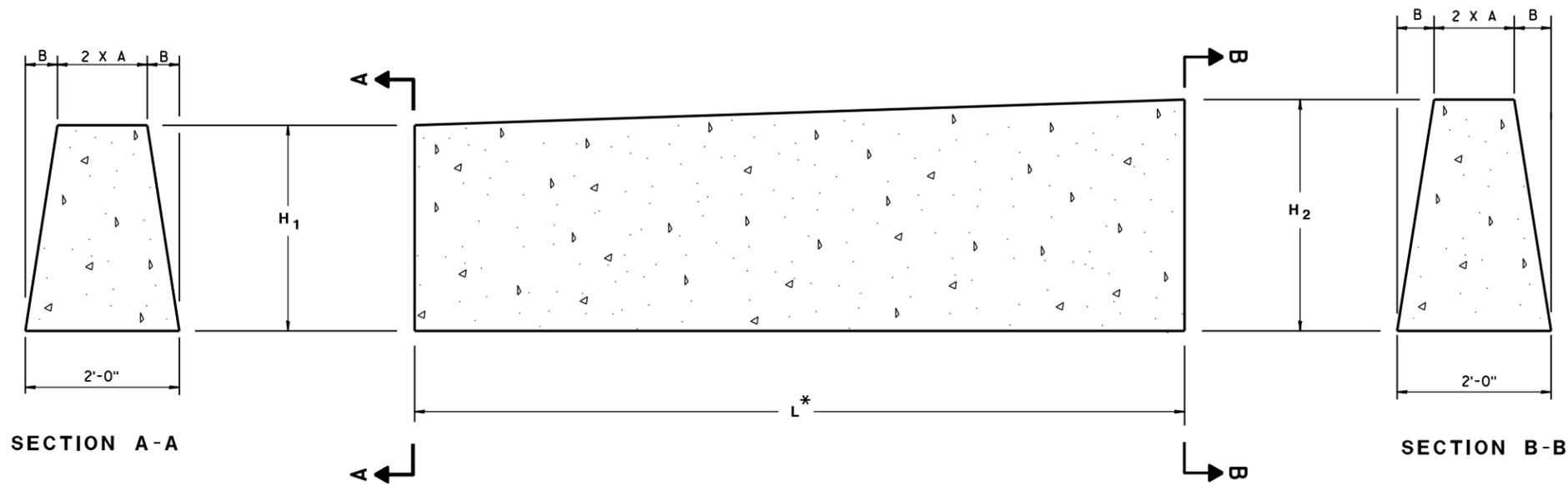
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

6

6

S.D.D. 14 B 32-4c

S.D.D. 14 B 32-4c



DOUBLE COLD JOINT HEIGHT TRANSITION

BARRIER DIMENSIONS

BARRIER HEIGHT INCHES	A INCHES	B INCHES
32	7	5
36	6 1/4	5 3/4
42	5 1/4	6 3/4
56	3	9

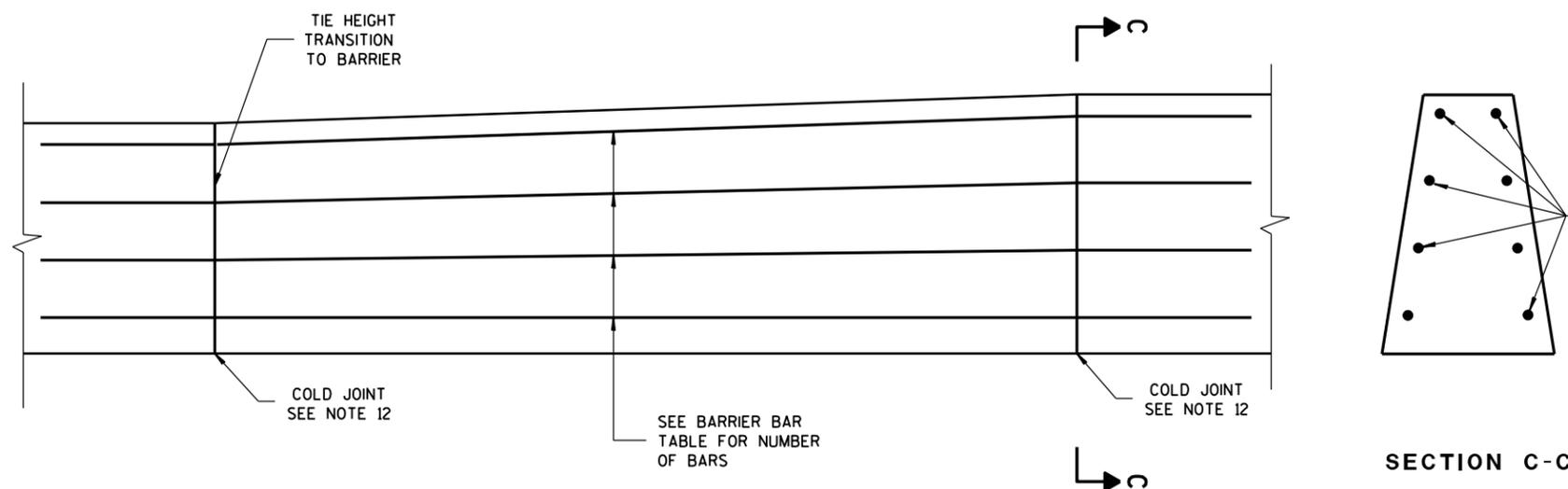
MULTIPLE HEIGHT TRANSITIONS MAY BE USED IN SEQUENCE TO GET TO APPROPRIATE HEIGHT.

USE COLD JOINT TO CONNECT MULTIPLE HEIGHT TRANSITIONS.

BARRIER BARS

H ₁	H ₂	L*	NUMBER OF NO. 5 BARS
32"	36"	10'-0"	8
36"	42"	10'-6"	10
42"	56"	24'-6"	11

* LENGTH OF DOUBLE COLD JOINT INCLUDED IN THE TOTAL LENGTH OF CBSS.



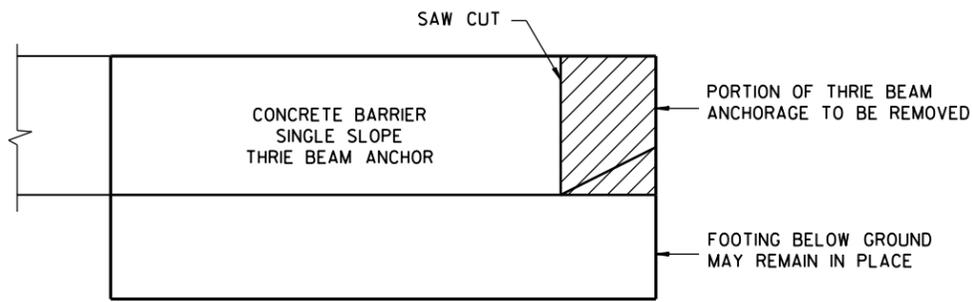
STEEL REINFORCEMENT DETAIL

SECTION C-C

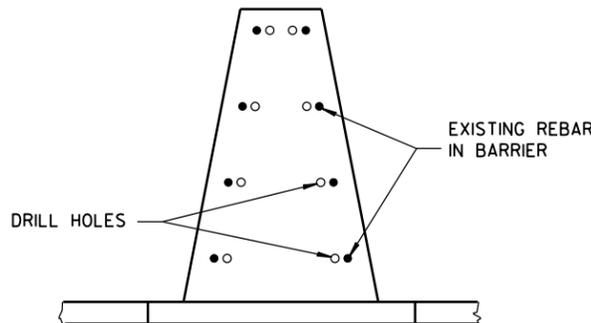
CONCRETE BARRIER
SINGLE SLOPE

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
DATE June 2016 /S/ Jerry H. Zogg
ROADWAY STANDARDS DEVELOPMENT ENGINEER
FHWA



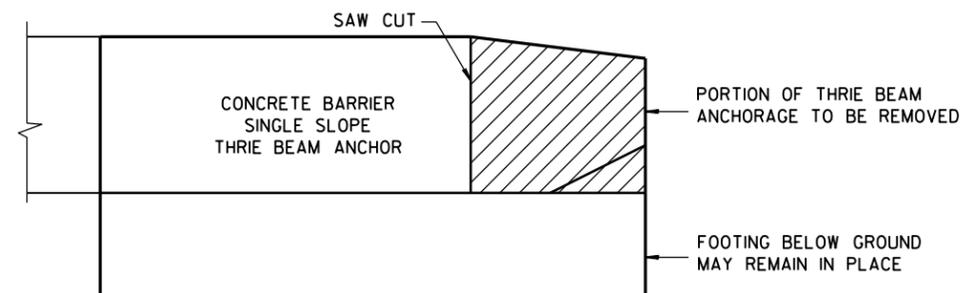
REMOVAL AREA OF 32" CONCRETE THRIE BEAM ANCHORAGE



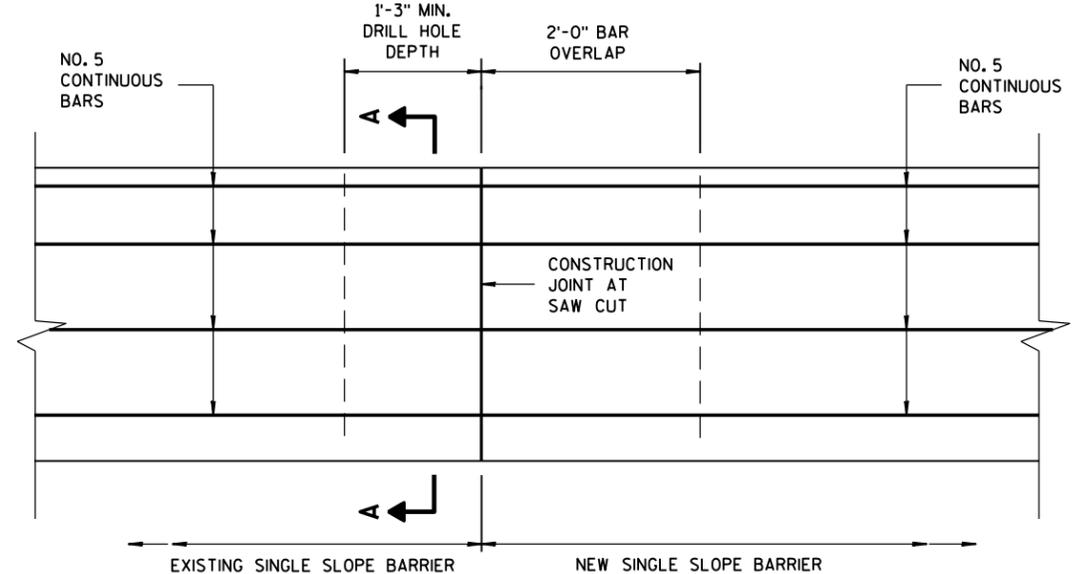
SECTION A-A

GENERAL NOTES

1. THE NUMBER OF DRILL HOLES IS EQUAL TO THE NUMBER OF REBAR IN BARRIER (SEE OTHER DETAILS).
2. MINIMUM DEPTH OF DRILL HOLES IS 1'-3".
3. DRILL HOLES TO BE A MINIMUM OF 4 INCHES FROM THE EDGE OF CONCRETE.
4. INSTALL EPOXY COATED NO. 5 BARS IN DRILL HOLES.
5. END ANCHORAGE MAY OR MAY NOT BE PRESENT ON EXISTING BARRIER.
6. REMOVE THRIE BEAM ANCHORAGE AS SHOWN.



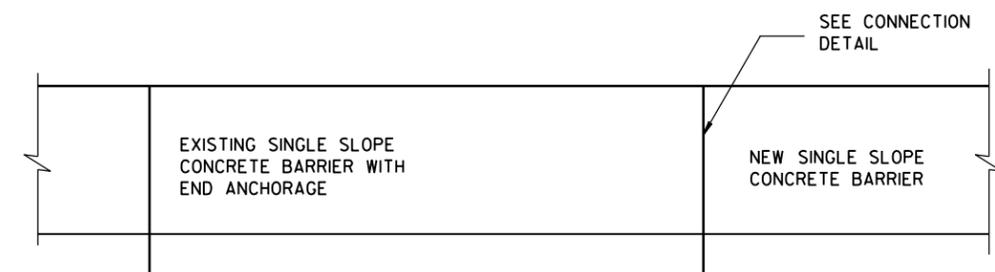
REMOVAL AREA OF CONCRETE THRIE BEAM ANCHORAGE WITH HEIGHT GREATER THAN 32"



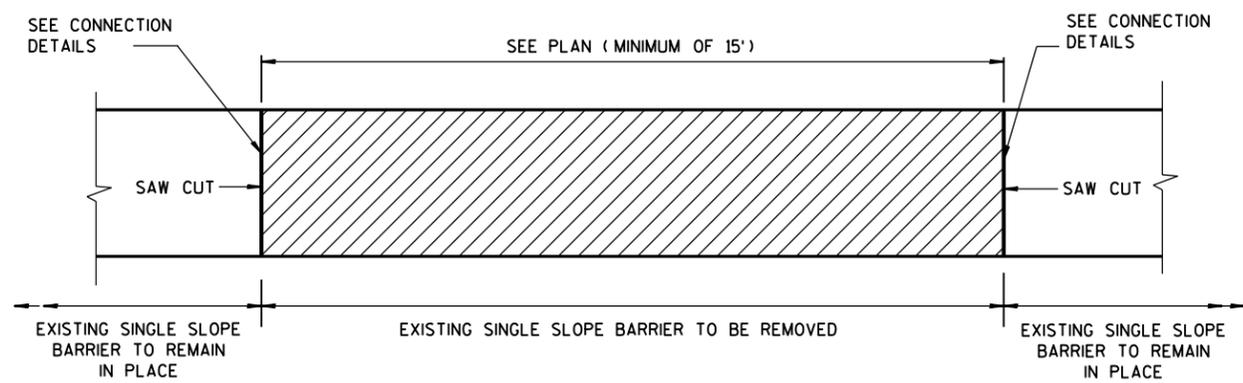
CONNECTION OF EXISTING SINGLE SLOPE CONCRETE BARRIER TO NEW SINGLE SLOPE CONCRETE BARRIER

6

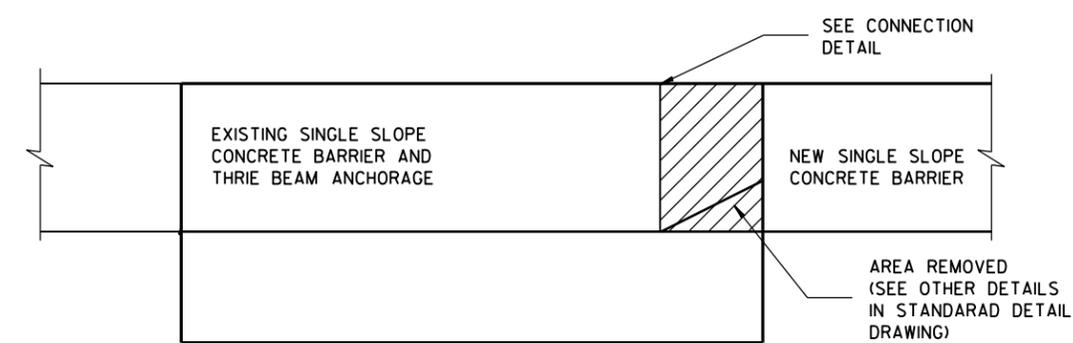
6



ELEVATION VIEW OF CONCRETE BARRIER EXTENSION NEAR END ANCHORAGE



ELEVATION VIEW OF BARRIER REMOVAL AND REPLACEMENT



ELEVATION VIEW OF CONCRETE BARRIER EXTENSION NEAR THRIE BEAM TERMINAL

RETROFIT OR REPAIR SINGLE SLOPE CONCRETE BARRIER

CONCRETE BARRIER SINGLE SLOPE	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED June 2016 DATE	/S/ Jerry H. Zogg ROADWAY STANDARDS DEVELOPMENT ENGINEER
FHWA	

S.D.D. 14 B 32-4e

S.D.D. 14 B 32-4e

Concrete Barrier Single Slope

References:

Standard Spec 633

[FDM 11-45-2](#)

FHWA/CA/ESC-98/02 Vehicular Crash Tests of Slip-formed, Single Slope, Concrete Median Barrier

FHWA Geometric and Safety Design Group Acceptance Letter BB-45

2006 CALTRANS Standard Plan Drawings A76A-F

Bid items associated with this drawing:

Bid items for single slope barrier and associated transitions are encoded as follows:

BARRIER BID ITEM TYPES		DESCRIPTION	CODE
<p>example: Concrete Barrier Type S36A is a 36" single sloped median retaining wall barrier</p>	SHAPE	New Jersey shape	NJ
		F shape	F
		Vertical	V
		Single slope barrier	S
<p>example: Concrete Barrier Transition Type F32SF to S32 is a transition from 32" single faced F barrier to a 32" single sloped barrier</p>	CLASS	Standard barrier section	none
		Median retaining wall	A
		Short barrier section	B
	Roadside retaining wall	C	
FACES	Double faced barrier	DF	
	Single faced barrier	SF	

ITEM NUMBER	DESCRIPTION	UNIT
204.0157	Removing Concrete Barrier	LF
603.1100 - 1199	Concrete Barrier Type S(height).....	LF
603.1200 - 1299	Concrete Barrier Type S(height) A	LF
603.2100 - 2199	Concrete Barrier Fixed Object Protection Type S(height)	LF
614.0200	Steel Thrie Beam Structure Approach	LF
614.0700	Sand Barrel Array	EACH
614.0800	Crash Cushions Permanent.....	EACH
614.0805	Crash Cushions Permanent Low Maintenance	EACH
614.0905	Crash Cushion Temporary.....	EACH
633.0500	Delineator Reflectors	EACH
633.1000	Delineator Brackets	EACH
690.0150	Sawing Asphalt	LF
690.0250	Sawing Concrete.....	LF

Standardized Special Provisions associated with this drawing:

STSP NUMBER	TITLE
NONE	

Other SDDs associated with this drawing:

SDD 14b20	Thrie Beam Structure Approaches
SDD 14b33	Thrie Beam Anchorages
SDD 14b34	Short Concrete Barrier Sections (Use for runs of less than 40')
SDD 14b35	Single-Faced NJ to Single Slope Transitions
SDD 14b36	Single-Faced F to Single Slope Transitions
SDD 14b37	Double-Faced NJ to Single Slope Transitions
SDD 14b38	Double-Faced F to Single Slope Transitions
SDD 14b39	Single Slope Barrier Height Transitions (Use when double cold joint is not feasible)

SDD 14b40	Vertical Face to Single Slope Transitions
SDD 14b41	Roadside Retaining Wall Barrier
SDD 15a2	Delineator Post, Delineator Bracket, and Delineator

Design Notes:

The concrete barrier design requires the use of various transitions for height, and shape transitions. In certain locations (e.g. near fixed objects) may require the use of other specialized transitions. The concrete barrier details are designed to have a crashworthy shape, and are structurally designed to contain an impact load. The concrete barrier design is not structural protection for bridge substructures.

Sheets A through D are required to install new single slope concrete barrier. Sheet E is used when design requires the removal of single slope barrier and installing new single slope barrier for the situations shown. If the design requires removal not shown in Sheet E provide a construction detail drawing.

[FDM 11-45-2.3.6.4.4](#) discusses using concrete barrier as a retaining wall. Also, refer to the Bridge Manual (Chapter 14 - Retaining Walls (<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/bridge-manual.aspx>)) and [FDM 11-55-5](#) Retaining Walls for modified designs.

Contact Person:

Erik Emerson (608) 266-2842