



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION
1401 EAST BROAD STREET
RICHMOND, VIRGINIA 23219 2000

Gregory A. Whirley
Commissioner

August 9, 2011

MEMORANDUM

To: All Holders of the Virginia Department of Transportation's 2008 Road and Bridge Standards

The following is a list of sheets contained in the 2008 Road and Bridge Standards that have been revised. Please add these pages to your copy of the standards. An interim standard sheet will not be required in plan assemblies for the following sheets only. Changes to these sheets will not affect the basis of payment or estimates.

PAGE	REVISION
300.01	Revised index voiding page 301.06 Standard PR-3 8" Continuously Reinforced Concrete Pavement (Wire Mesh Reinforcement)
802.43	New superelevation table for 75 mph.
802.44	New superelevation table for 80 mph.

The following is a list of revised standards to the 2008 Road and Bridge Standards that require an interim standard sheet to be included in your plan assembly until the next edition of the imperial standards is published. Please add these pages to your copy of the standards. The respective interim standard sheet number has been placed with the revised standard. An interim standard sheet is available for each of these revised standards. The interim standard sheets are available on VDOT's web site, on the FTP server, and in Falcon DMS for VDOT personnel. These interim standard sheets will be required in plan assemblies for Tier 1 projects advertised December 27, 2011 and later along with Tier 2 projects advertised April 10, 2012 and later.

PAGE	INTERIM	STANDARD	REVISION
107.01	IIS01_04	PB-1	CLARIFIED AREA FOR BACKFILL ON PLASTIC PIPE

PAGE	INTERIM	STANDARD	REVISION
203.05	IIS02_04	CG-12	ADDED DETAIL FOR PLACEMENT OF DETECTABLE WARNING SURFACES AND ADJUSTED THE LOCATION OF THE CURB AT THE BACK OF THE RAMP TO ALLOW A 5' SIDEWALK
203.06	IIS02_04	CG-12	REMOVED ALTERNATE DETAIL
203.07	IIS02_04	CG-12	ADJUSTED THE LOCATION OF THE CURB AT THE BACK OF THE RAMP TO ALLOW A 5' SIDEWALK
203.08	IIS02_04	CG-12	ADJUSTED THE LOCATION OF THE CURB AT THE BACK OF THE RAMP TO ALLOW A 5' SIDEWALK
501.04	IIS05_09	GR-2, 2A	REVISED MINIMUM HEIGHT TO 27 ¾"
501.05	IIS05_10	GR-2, 2A	REVISED MINIMUM HEIGHT TO 27 ¾"
501.09	IIS05_05	GR-6	REVISED MINIMUM HEIGHT TO 27 ¾"
501.19	IIS05_11	GR-10	REVISED MINIMUM HEIGHT TO 27 ¾"
501.25	IIS05_12	GR-FOA-1	REVISED MINIMUM HEIGHT TO 27 ¾"
501.26	IIS05_13	GR-FOA-1	REVISED MINIMUM HEIGHT TO 27 ¾"
501.28	IIS05_14	GR-FOA-2	REVISED MINIMUM HEIGHT TO 27 ¾"
501.29	IIS05_15	GR-FOA-2	REVISED MINIMUM HEIGHT TO 27 ¾"
501.31	IIS05_16	GR-FOA-4	REVISED MINIMUM HEIGHT TO 27 ¾"
501.33	IIS05_17	FOA-CZ	REVISED MINIMUM HEIGHT TO 27 ¾"
501.39	IIS05_08	GR-INS	REVISED MINIMUM HEIGHT TO 27 ¾"
502.01	IIS05_18	MB-3	REVISED MINIMUM HEIGHT TO 27 ¾"
502.24	IIS05_19	MB-INS	REVISED MINIMUM HEIGHT TO 27 ¾"
503.04	IIS05_20	FE-CL	CLARIFIED POST SIZES TO O.D. DIMENSIONS TO MATCH INDUSTRY STANDARDS
601.05	IIS06_01	HR-1	REVISED PICKET SIZES FOR PEDESTRIAN AND BICYCLE RAILINGS, ADDED SOLID PICKET OPTION, ADJUSTED POST HEIGHT TO MATCH RAILING HEIGHT

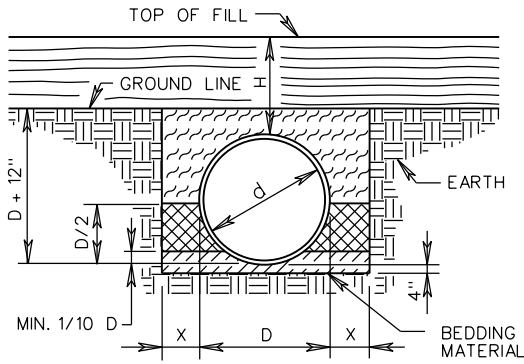
The Box Culvert Standards Section 1000 has been replaced in it's entirety to comply with the LRFD design criteria. The interim standard sheets will be listed by the corresponding page number. Every box culvert will require interim standard sheets when used.

If you have any questions or comments regarding this revision to the publication, please contact Chuck Patterson, at (804) 786-1805, of the Standards and Special Design Section.

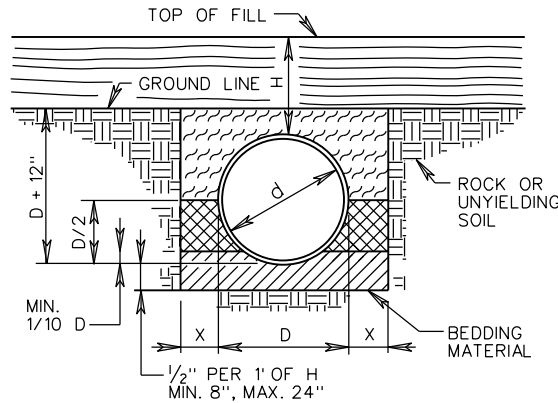
Sincerely,
Signature on file: August 9, 2011

Mohammad Mirshahi, P.E.
State Location and Design Engineer

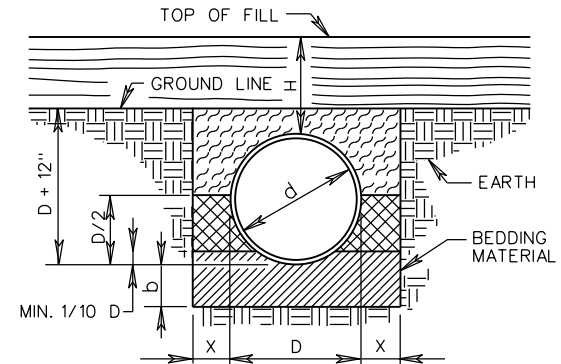
NO PROJECTION OF PIPE ABOVE GROUND LINE



NORMAL EARTH FOUNDATION

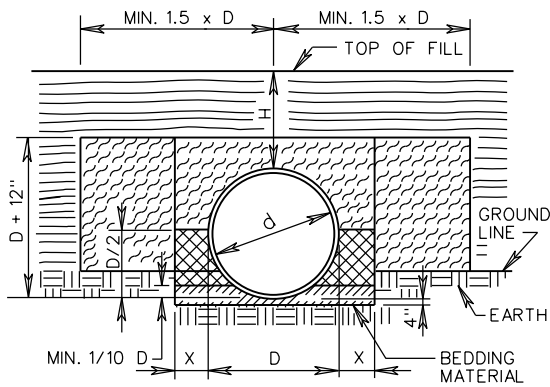


ROCK FOUNDATION

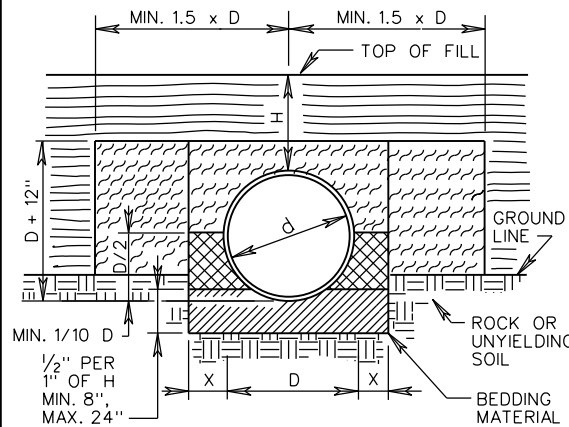


FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

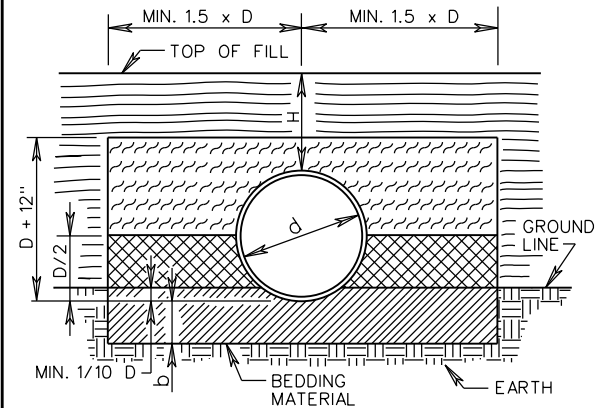
PIPE PROJECTION ABOVE GROUND LINE




NORMAL EARTH FOUNDATION




ROCK FOUNDATION




FOUNDATION SOFT, YIELDING, OR OTHERWISE UNSUITABLE MATERIAL

 BEDDING MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

 CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

 FOR PLASTIC PIPE CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

 FOR ALL OTHER PIPE REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

 EMBANKMENT

NOTES:

FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.

CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE SIZE 25 AND 26 MAY BE USED IN PLACE OF CLASS I BACKFILL.



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 4

REVISION DATE

107.01

7/11

INSTALL. OF PIPE CULVERTS AND STORM SEWERS
CIRC. PIPE BEDDING AND BACKFILL - METHOD "A"

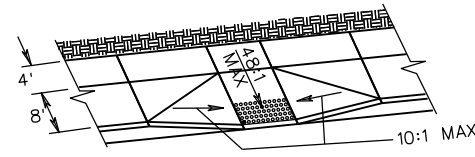
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

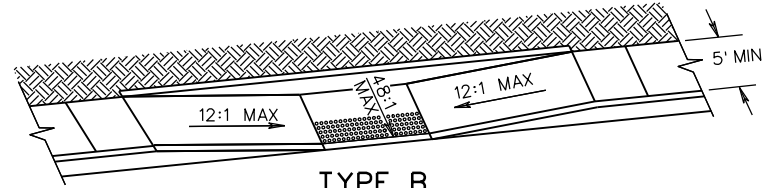
302
303

GENERAL NOTES:

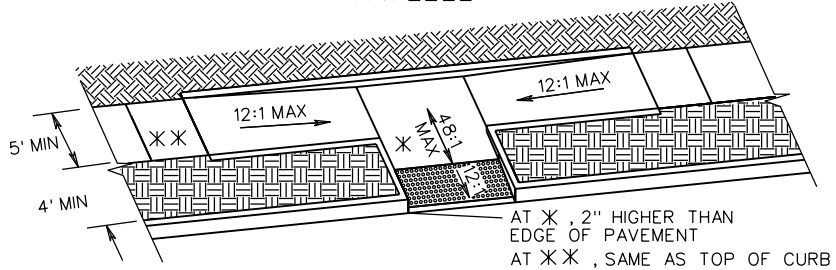
1. THE DETECTABLE WARNING SHALL BE PROVIDED BY TRUNCATED DOMES.
2. DETECTABLE WARNING TO BE CLASS A-3 CONCRETE (CLASS A-4 IF PRECAST) WITH SLIP RESISTANT INTEGRAL SURFACE COVERING THE FULL WIDTH OF THE RAMP FLOOR BY 2 FOOT IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. OTHER TYPES OF MATERIAL WITH THE TRUNCATED DOMES DETECTABLE WARNING MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
3. SLOPING SIDES OF CURB RAMP MAY BE POURED MONOLITHICALLY WITH RAMP FLOOR OR BY USING PERMISSIBLE CONSTRUCTION JOINT WITH REQUIRED BARS.
4. IF RAMP FLOOR IS PRECAST, HOLES MUST BE PROVIDED FOR DOWEL BARS SO THAT ADJOINING FLARED SIDES CAN BE CAST IN PLACE AFTER PLACEMENT OF PRECAST RAMP FLOOR. PRECAST CONCRETE SHALL BE CLASS A-4.
5. REQUIRED BARS ARE TO BE NO. 5 X 8" PLACED 1' CENTER TO CENTER ALONG BOTH SIDES OF THE RAMP FLOOR, MID-DEPTH OF RAMP FLOOR. MINIMUM CONCRETE COVER 1/2".
6. CURB / CURB AND GUTTER SLOPE TRANSITIONS ADJACENT TO CURB RAMPS ARE INCLUDED IN PAYMENT FOR CURB / CURB AND GUTTER.
7. CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THEY ARE TO BE PROVIDED AT INTERSECTIONS WHEREVER AN ACCESSIBLE ROUTE WITHIN THE RIGHT OF WAY OF A HIGHWAY FACILITY CROSSES A CURB REGARDLESS OF WHETHER SIDEWALK IS EXISTING, PROPOSED, OR NONEXISTENT. THEY MUST BE LOCATED WITHIN PEDESTRIAN CROSSWALKS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER, AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES, EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. ACCESSIBLE ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, FIRM AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.
8. RAMPS MAY BE PLACED ON RADIAL OR TANGENTIAL SECTIONS PROVIDED THAT THE CURB OPENING IS PLACED WITHIN THE LIMITS OF THE CROSSWALK AND THAT THE SLOPE AT THE CONNECTION OF THE CURB OPENING IS PERPENDICULAR TO THE CURB.
9. TYPICAL CONCRETE SIDEWALK IS 4" THICK. WHEN THE ENTRANCE RADIICANNOT ACCOMMODATE THE TURNING REQUIREMENTS OF ANTICIPATED HEAVY TRUCK TRAFFIC, REFER TO STANDARD CG-13, COMMERCIAL ENTRANCE (HEAVY TRUCK TRAFFIC) FOR CONCRETE DEPTH.
10. WHEN CURB RAMPS ARE USED IN CONJUNCTION WITH A SHARED USE PATH, THE MINIMUM WIDTH SHALL BE THE WIDTH OF THE SHARED USE PATH
11. WHEN ONLY ONE CURB RAMP IS PROVIDED FOR TWO CROSSINGS (DIAGONAL), A 4' x 4' LANDING AREA SHALL BE PROVIDED TO MANEUVER A WHEELCHAIR INTO THE CROSSWALK WITHOUT GOING INTO THE TRAVELWAY. THIS 4' x 4' LANDING AREA MAY INCLUDE THE GUTTER PAN.
12. ALL CASES WHERE CURB RAMPS INTERSECT A RADIAL SECTION OF CURB AT ENTRANCES OR STREET CONNECTIONS THE DETECTABLE WARNING SURFACE SHALL HAVE A FACTORY RADIUS OR BE FIELD -MODIFIED AS RECOMMENDED BY THE MANUFACTURER TO MATCH THE BACK OF CURB.



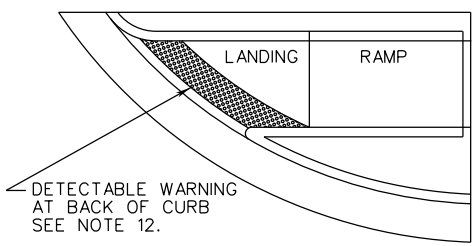
**TYPE A
PERPENDICULAR**



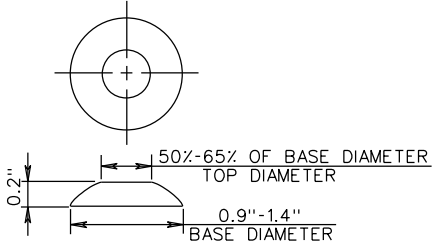
**TYPE B
PARALLEL**



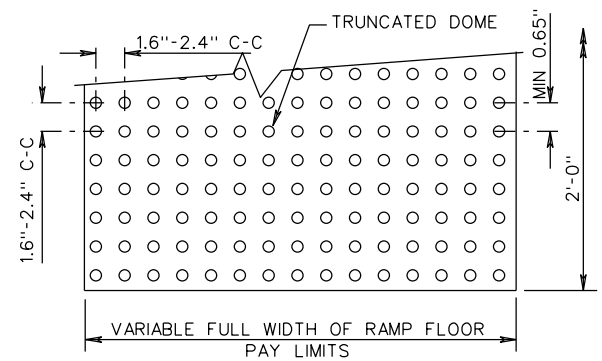
**TYPE C
PARALLEL & PERPENDICULAR**



**DETECTABLE WARNING
INSTALLED ON A RADIUS**



**TRUNCATED DOME
DETAIL**



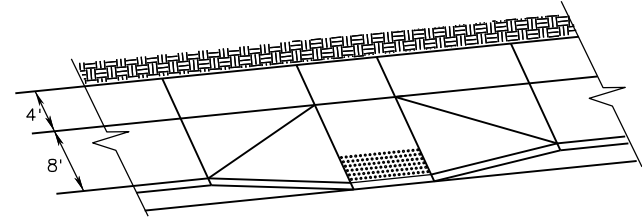
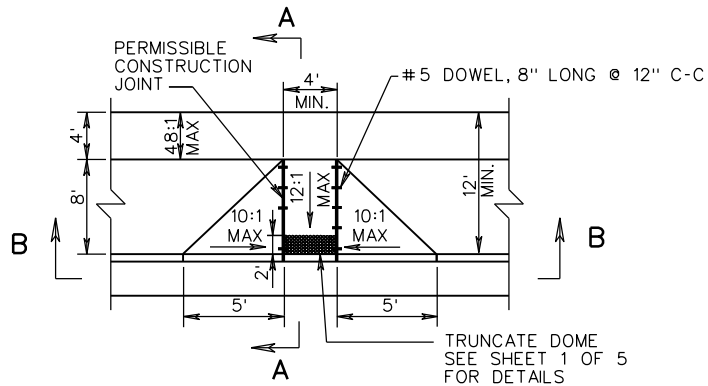
**DETECTABLE WARNING
DETAIL**

VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 5	REVISION DATE
203.05	7/11

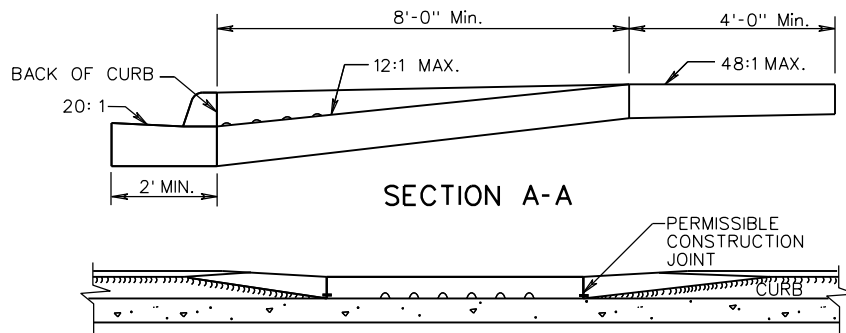
**CG-12 DETECTABLE WARNING SURFACE
(GENERAL NOTES)**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
105 502

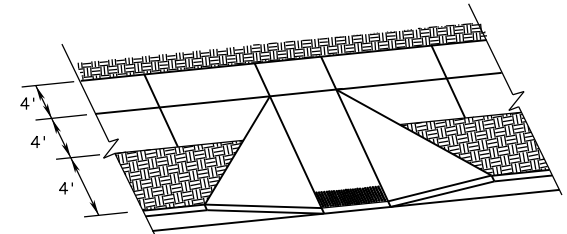


TYPICAL DESIGN



SECTION A-A

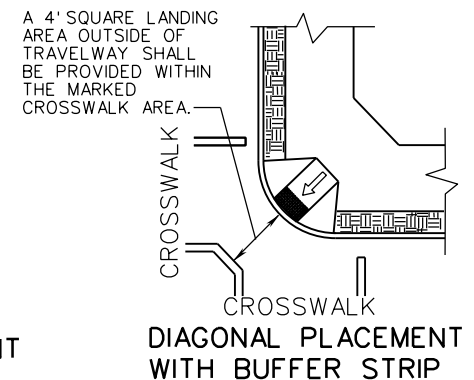
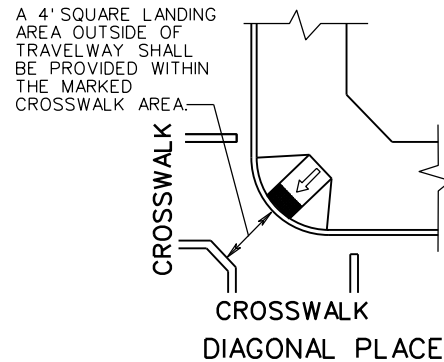
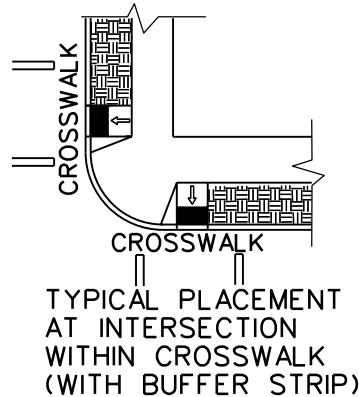
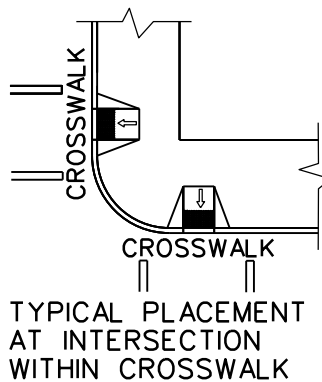
SECTION B-B



TYPE A WITH BUFFER STRIP

NOTES:
FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.

THIS DESIGN TO BE USED FOR CONSTRUCTION THAT INCORPORATES WIDER SIDEWALK. LANDING (4' WIDE) REQUIRED AT TOP OF CURB RAMP. MINIMUM CURB RAMP LENGTH 8 FEET FOR NEW CONSTRUCTION, 6 FEET FOR ALTERATIONS.



SPECIFICATION REFERENCE

105
502

CG-12 DETECTABLE WARNING SURFACE
TYPE A (PERPENDICULAR) APPLICATION

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

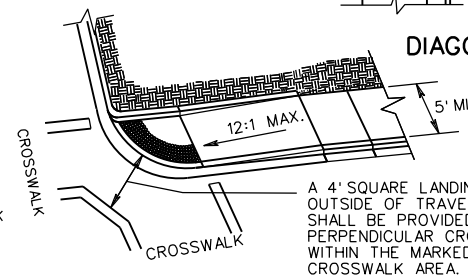
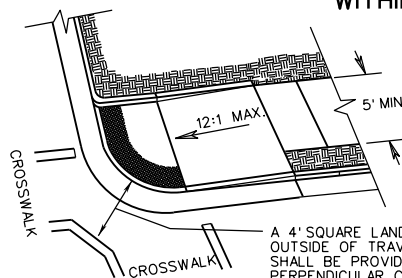
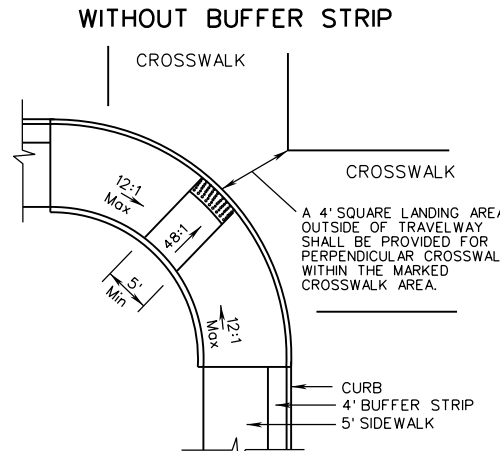
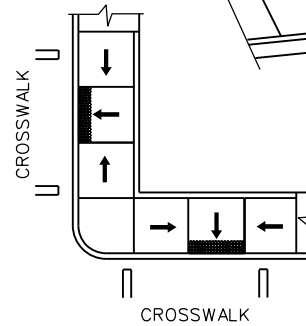
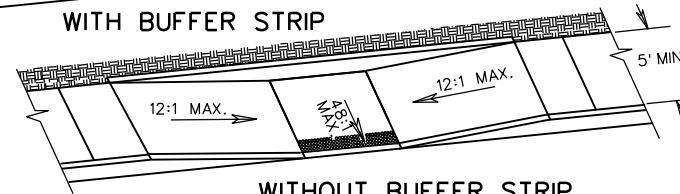
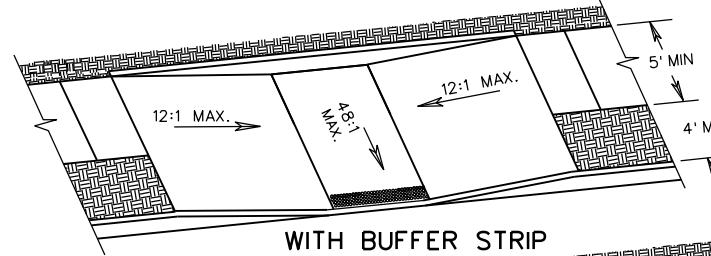
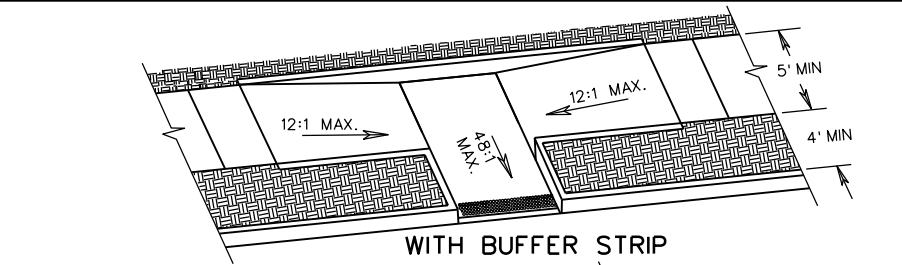
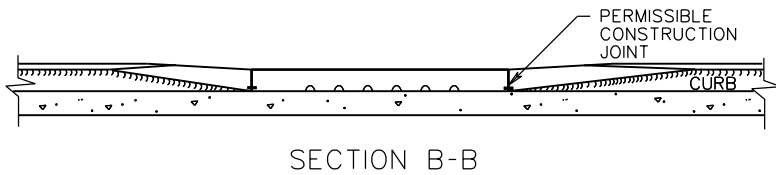
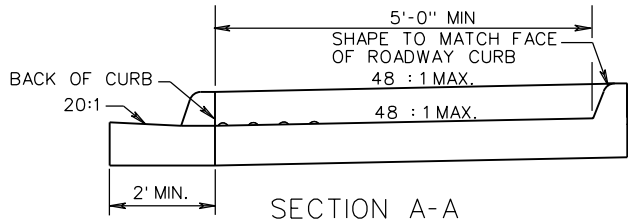
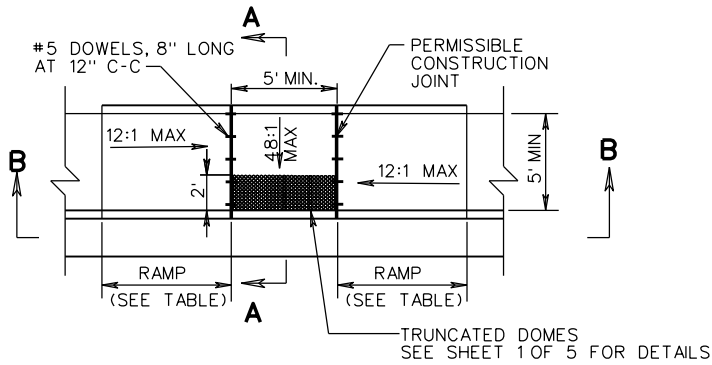
ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 2 OF 5

7/11

203.06



NOTES: FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.

THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.

TYPE B PARALLEL APPLICATION		
ROADWAY GRADE IN PERCENT	MINIMUM RAMP LENGTH IN FEET	
	4" CURB	6" CURB
0	4	6
1	5	7
2	5	8
3	6	9
4	8	12
5	10	15
6	14	15

WITH BUFFER STRIP

A 4' SQUARE LANDING AREA OUTSIDE OF TRAVELWAY SHALL BE PROVIDED FOR PERPENDICULAR CROSSWALK WITHIN THE MARKED CROSSWALK AREA.

A 4' SQUARE LANDING AREA OUTSIDE OF TRAVELWAY SHALL BE PROVIDED FOR PERPENDICULAR CROSSWALK WITHIN THE MARKED CROSSWALK AREA.



ROAD AND BRIDGE STANDARDS

SHEET 3 OF 5

REVISION DATE

203.07

7/11

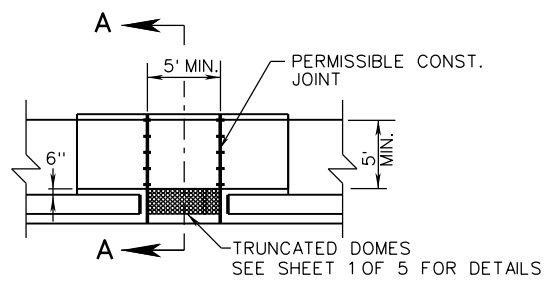
CG-12 DETECTABLE WARNING SURFACE

TYPE B (PARALLEL) APPLICATION

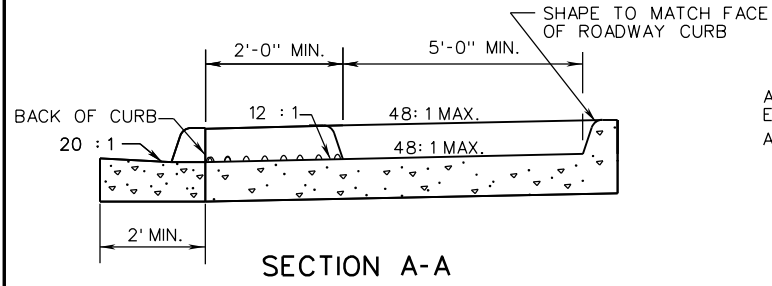
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

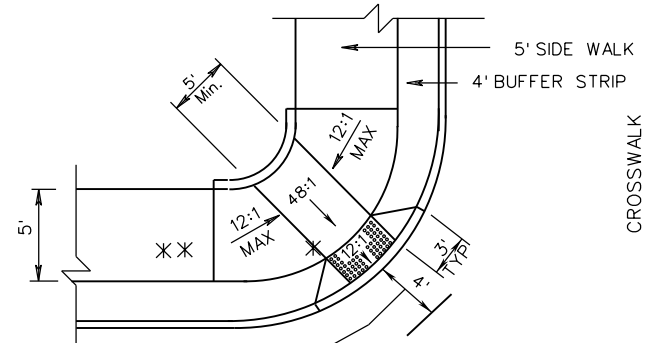
105
502



TANGENT PLAN

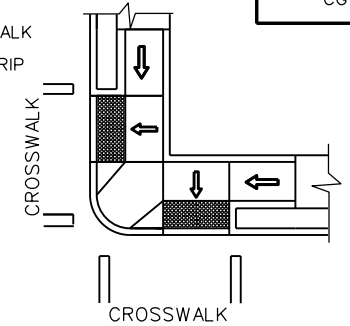


SECTION A-A

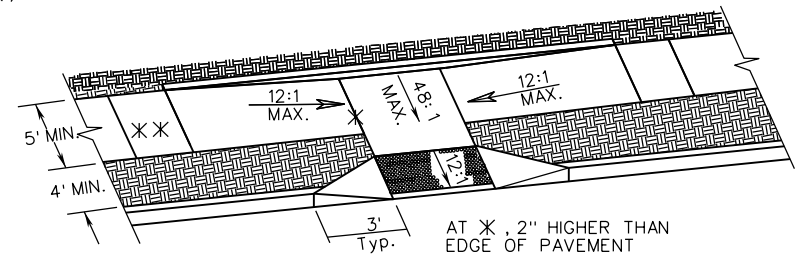


A 4' SQUARE LANDING AREA OUTSIDE OF TRAVELWAY SHALL BE PROVIDED WITHIN THE MARKED CROSSWALK AREA.

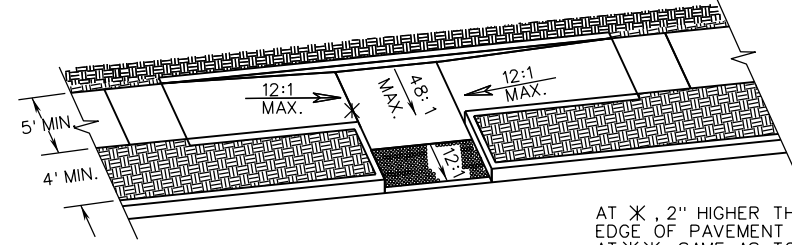
AT ✕, 2" HIGHER THAN EDGE OF PAVEMENT
AT ✕✕, SAME AS TOP OF CURB



TYPICAL PLACEMENT AT INTERSECTION WITH BUFFER STRIP



AT ✕, 2" HIGHER THAN EDGE OF PAVEMENT
AT ✕✕, SAME AS TOP OF CURB



AT ✕, 2" HIGHER THAN EDGE OF PAVEMENT
AT ✕✕, SAME AS TOP OF CURB

TYPE C PARALLEL & PERPENDICULAR APPLICATION		
ROADWAY GRADE IN PERCENT	MINIMUM RAMP LENGTH IN FEET	
	4" CURB	6" CURB
0	2	4
1	2	5
2	3	5
3	3	6
4	4	8
5	5	10
6	7	14
7	13	15
8	15	15

THE REQUIRED LENGTH OF A PARALLEL RAMP IS LIMITED TO 15 FEET, REGARDLESS OF THE SLOPE.

NOTES: FOR GENERAL NOTES ON THE DETECTABLE WARNING SURFACE, SEE SHEET 1 OF 5.

THE SELECTION OF CURB TYPE AND THE CONFIGURATION OF THE BUFFER STRIP MAY VARY TO MEET EXISTING FIELD CONDITIONS AND ROADWAY GEOMETRICS PROVIDING THE DIMENSIONS AND SLOPES ARE AS NOTED.

THIS COMBINED (PARALLEL & PERPENDICULAR) DESIGN CAN BE USED WITH ADJOINING BUFFER STRIP. LANDING AT BOTTOM OF TWO SLOPING SIDES WITH 5' X 5' MIN. DIMENSIONS. THE SHORT PERPENDICULAR RUN TO THE STREET CAN BE PROTECTED BY A LANDSCAPED SETBACK OR CONNECTED TO THE SIDEWALK WITH A WARPED SURFACE.

SPECIFICATION REFERENCE
105 502

CG-12 DETECTABLE WARNING SURFACE
TYPE C (PARALLEL & PERPENDICULAR) APPLICATION
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 4 OF 5
7/11	203.08

STANDARD	TITLE	PAGE
PR-2	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.01
	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.02
	PLAIN AND REINFORCED CONCRETE PAVEMENT SHOWING REINFORCEMENT, LONGITUDINAL AND TRANSVERSE JOINTS	301.03
	STANDARD LOAD TRANSFER ASSEMBLY CONTRACTION JOINT	301.04
	STANDARD LOAD TRANSFER ASSEMBLY EXPANSION JOINT	301.05
PR-3	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (WIRE MESH REINFORCEMENT)	THIS STANDARD IS VOID 301.06
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (STEEL BAR REINFORCEMENT)	301.07
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (FOR USE WITH BAR OR WIRE MESH REINFORCEMENT)	301.08
	8" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (LEAVE OUT JOINT DETAIL)	301.09
PR-4	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (STEEL BAR REINFORCEMENT)	301.10
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (FOR USE WITH BAR REINFORCEMENT ONLY)	301.11
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT (LEAVE OUT JOINT DETAIL)	301.12
PR-5	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.13
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.14
	9" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.15
PR-6	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.16
	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.17
	10" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.18
PR-7	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.19
	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.20
	11" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.21
PR-8	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.22
	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.23
	12" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.24
PR-9	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.25
	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.26
	13" CONTINUOUSLY REINFORCED CONCRETE PAVEMENT 14 FOOT TRAVEL LANE	301.27
XJ-1	BRIDGE APPROACH EXPANSION JOINT (FOR WIDENING OR MAINTENANCE OR EXISTING XJ-1 ONLY)	302.01
	BRIDGE APPROACH EXPANSION JOINT (INSTALLATION CRITERIA)	302.02
WP-1	METHOD OF WIDENING BRIDGE APPROACH PAVEMENT	303.01
WP-2	PAVEMENT WIDENING	303.02
RS-1	CONTINUOUS SHOULDER RUMBLE STRIPS	304.01
RS-3	CENTERLINE RUMBLE STRIPS	304.02
RS-4	CONTINUOUS SHOULDER RUMBLE STRIPES	304.03
RS-5	INTERMITTENT SHOULDER RUMBLE STRIPS	304.04
TPT-1	TRANSVERSE PAVEMENT TIE-IN	305.01

INDEX OF SHEETS
SECTION 300-PAVEMENT ITEMS

VIRGINIA DEPARTMENT OF TRANSPORTATION



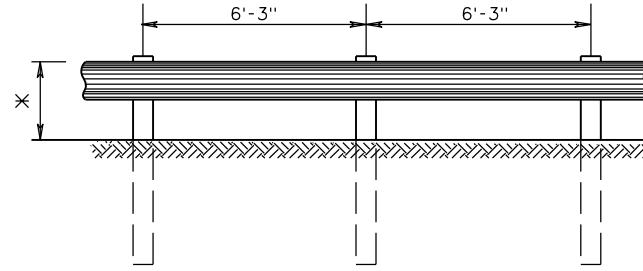
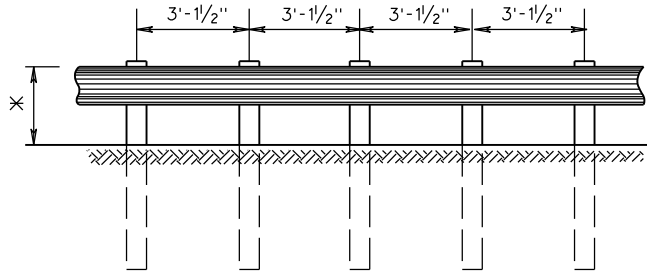
ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 1

7/11

300.01



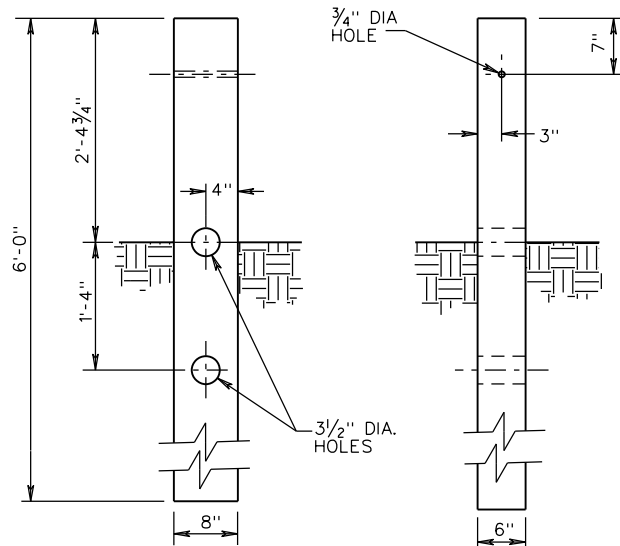
* 27³/₄" MIN - 28³/₄" MAX RAIL HEIGHT

GR-2A

(3'-1/2" POST SPACING)
MAX DYNAMIC DEFLECTION = 2'

GR-2

(6'-3" POST SPACING)
MAX DYNAMIC DEFLECTION = 3'



CRT POST

NOTES:

GUARDRAIL LOCATIONS SHOWN ON PLANS ARE APPROXIMATE ONLY AND CAN BE ADJUSTED DURING CONSTRUCTION IF AND AS DIRECTED BY THE ENGINEER.

FOR DETAILS OF POST AND BLOCKOUTS SEE SHEET NO. 501.05.

FOR DETAILS OF RAIL ELEMENT, RAIL SPLICE JOINT, AND ASSOCIATED HARDWARE SEE SHEET NOS. 501.01 AND 501.02.

RAIL ELEMENTS ARE FURNISHED SHOP CURVED FOR RADII BETWEEN 5 FEET AND 150 FEET.

ALL GUARDRAIL POSTS SHALL BE SET PLUMB. POST SHALL NOT BE SET WITH A VARIATION OF MORE THAN 1/8" PER FOOT FROM VERTICAL. W-BEAM, BLOCKOUTS, AND POSTS SHALL BE SET AND ALIGNED WITHOUT ALTERATION OR FORCE, AS PER SECTION 505 OF THE SPECIFICATIONS.

ALL GR-2 AND GR-2A RAIL SHALL BE MAINTAINED AT A HEIGHT OF 27³/₄" MIN - 28³/₄" MAX AS MEASURED PER STANDARD GR-INS.

ALL W-BEAM RAILS SHALL BE LAPPED IN THE DIRECTION OF VEHICULAR TRAVEL FOR THE FINISHED ROADWAY.



ROAD AND BRIDGE STANDARDS

STANDARD BLOCKED-OUT W-BEAM GUARDRAIL
(STRONG POST SYSTEM)

SPECIFICATION REFERENCE

SHEET 1 OF 2

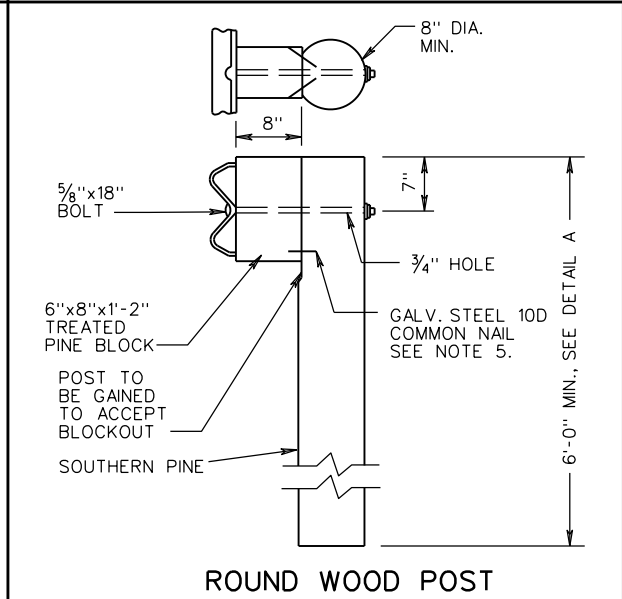
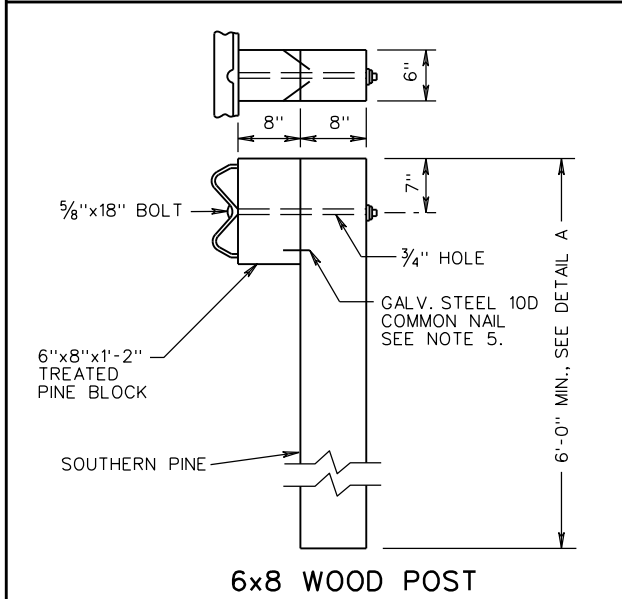
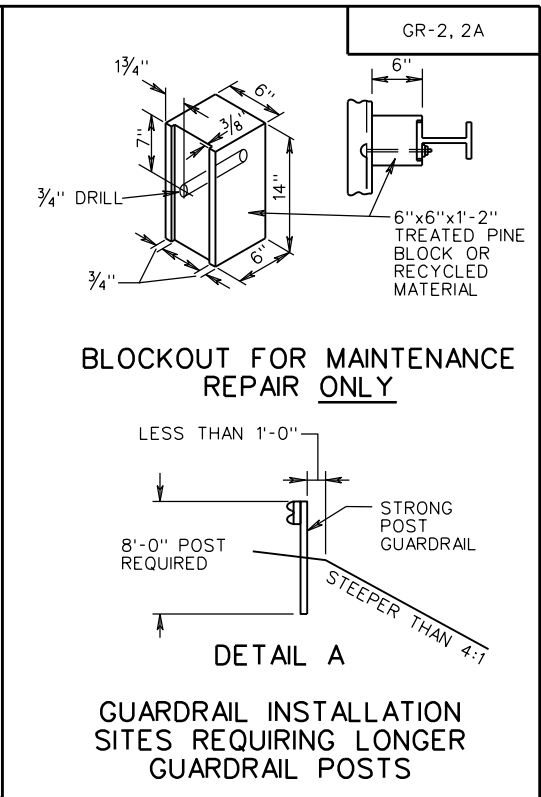
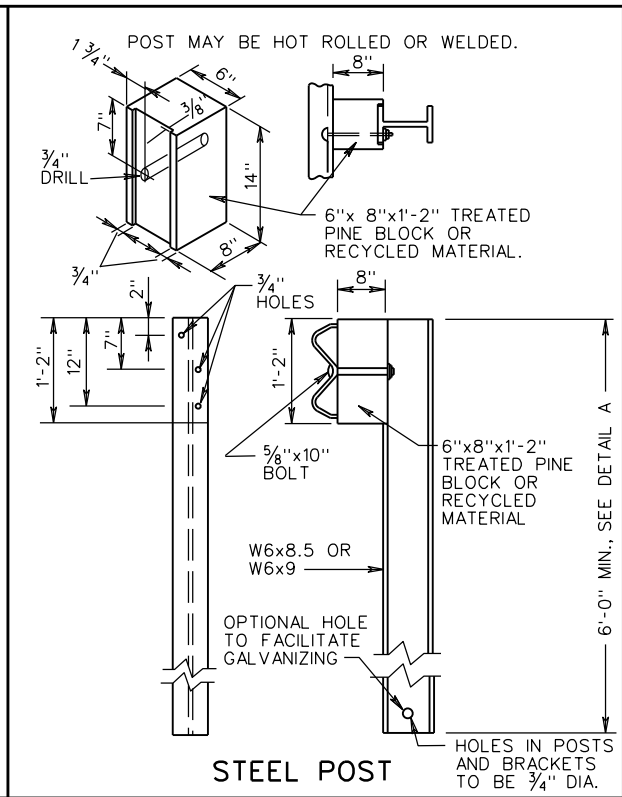
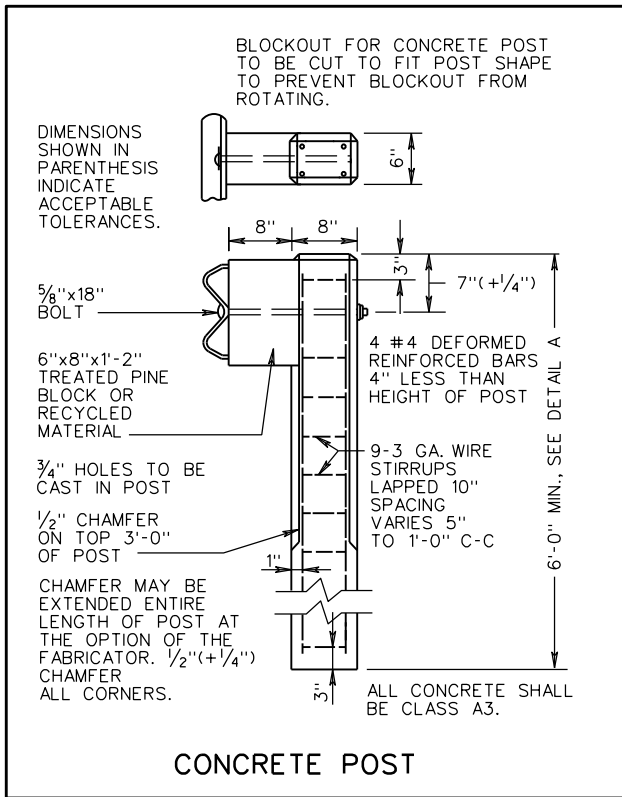
REVISION DATE

221
505

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7/11

VIRGINIA DEPARTMENT OF TRANSPORTATION

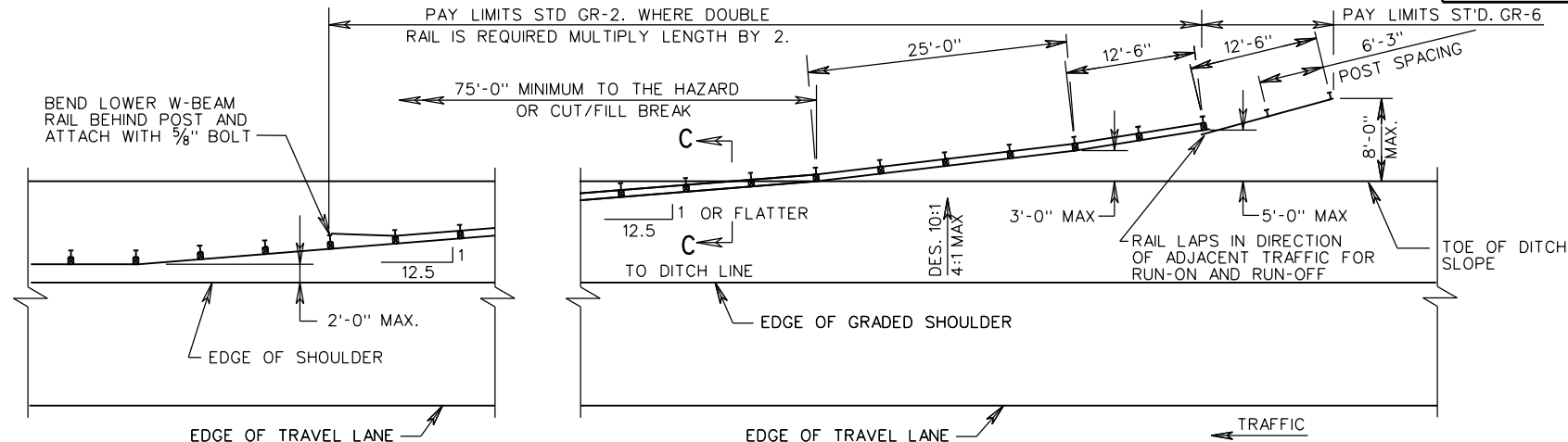


- NOTES:
1. ALL BOLTS, NUTS, WASHERS, AND OTHER STEEL ITEMS ARE TO BE GALVANIZED.
 2. ALTERNATE TYPE POSTS AND BLOCKOUT MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF POST AND BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF GUARDRAIL.
 3. FOR DETAILS OF GUARDRAIL ELEMENT SPLICE JOINT, HARDWARE, ETC. SEE SHEET NOS. 501.01 AND 501.02.
 4. THE GUARDRAIL AND MEDIAN BARRIER COMPONENTS DEPICTED IN A.R.T.B.A. TECHNICAL BULLETIN NUMBER 268B MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.
 5. DRIVE NAIL ON BOTH SIDES WITHIN 2" OF THE TOP OR BOTTOM OF BLOCKOUT AFTER 5/8" x 18 BOLT IS INSTALLED.

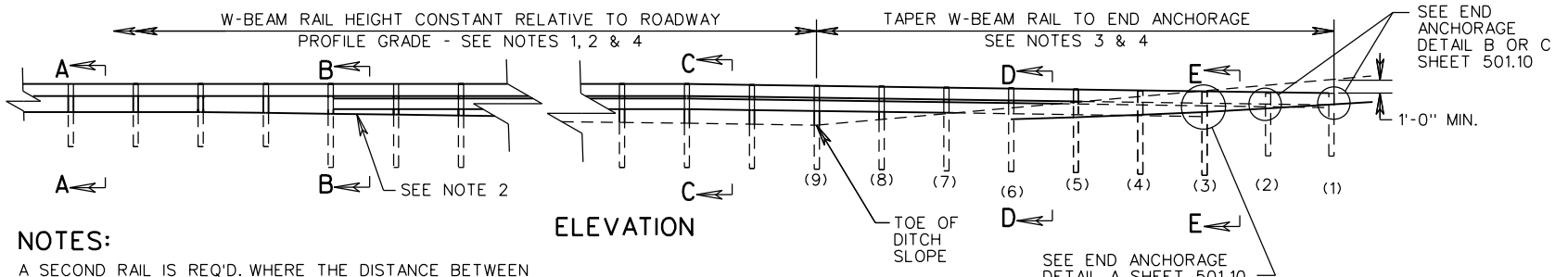
SPECIFICATION REFERENCE
221
236
505

STANDARD BLOCKED-OUT W-BEAM GUARDRAIL
(STRONG POST SYSTEM, POST AND BLOCKOUT DETAILS)
 VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT	
ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 2 OF 2
7/11	501.05



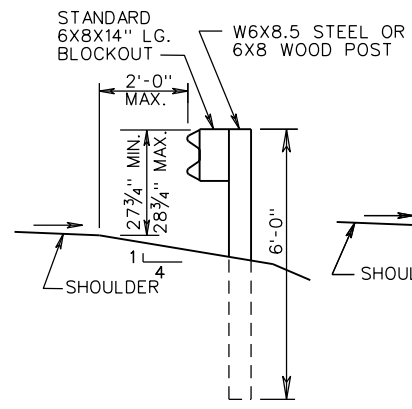
PLAN



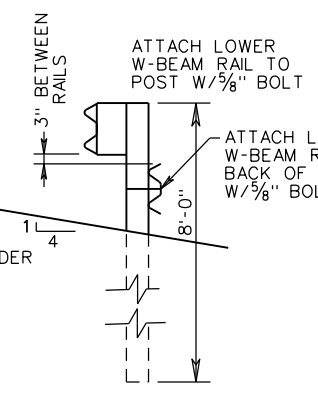
ELEVATION

NOTES:

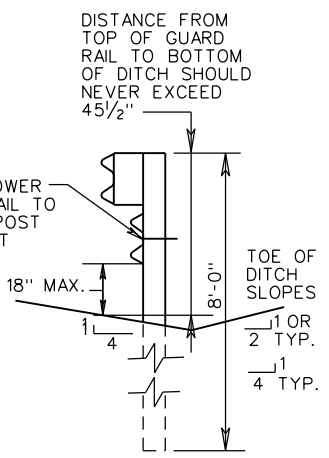
1. A SECOND RAIL IS REQ'D. WHERE THE DISTANCE BETWEEN THE GROUND AND BOTTOM OF THE TOP RAIL EXCEEDS 18" (UP TO THE POINT WHERE THE RAIL CROSSES THE DITCH LINE). THE DOUBLE RAIL WILL EXTEND TO POST #3.
2. MAXIMUM DISTANCE BETWEEN BOTTOM OF THE LOWER W-BEAM RAIL AND GROUND LINE IS 18". WHEN DOUBLE RAIL IS REQ'D., TAPER BOTH W-BEAM RAILS TO MAINTAIN THE 18" DISTANCE FROM THE GROUND.
3. BOTH W-BEAM RAILS TO BE 1'-0" BELOW FINISHED GRADE AT POST #1 (8'-0" OFFSET).
4. A 8'-0" LONG POST MUST BE USED WHEN UPPER AND LOWER W-BEAM RAILS ARE REQUIRED. FROM THE BEGINNING OF THE LOWER RAIL THROUGH POST #3.
5. STANDARD GR-6 TERMINAL TREATMENT MAY BE USED AT THE RUN-ON END OF DIVIDED HIGHWAYS (LEFT AND RIGHT OF TRAFFIC) AND AT THE RUN-ON AND RUN-OFF ENDS ON UNDIVIDED HIGHWAYS.
6. ALL POST SPACING 6'-3" C-C UNLESS OTHERWISE NOTED. THE POST MAY BE W6 X 8.5 STEEL OR 6 X 8 WOOD EXCEPT THE LAST 3 TERMINAL POSTS MUST BE W6 X 8.5 STEEL.
7. FOR SECTIONS D-D & E-E, AND END ANCHORAGE DETAILS SEE SHEET 501.10.
8. ALL TERMINAL RUN-ON OR RUN-OFF INSTALLATIONS SHALL BE INSTALLED WITH RAILS LAPPED IN THE DIRECTION OF ADJACENT TRAFFIC.
9. IF THE BACKSLOPE IS ROCK AND 1:1 OR STEEPER, THE W-BEAM MAY BE ANCHORED PER SOLID ROCK CUT INSTALLATION (DETAIL F).



SECTION A-A



SECTION B-B



SECTION C-C

SPECIFICATION REFERENCE

221
505

TERMINAL TREATMENT FOR W-BEAM GUARDRAIL

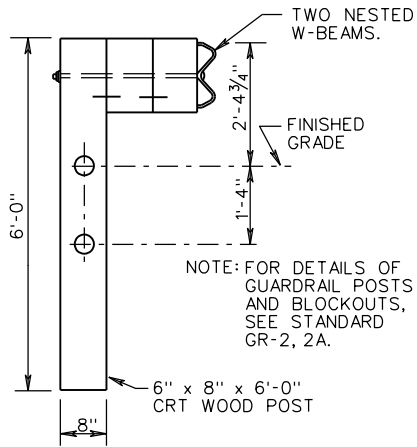
VIRGINIA DEPARTMENT OF TRANSPORTATION



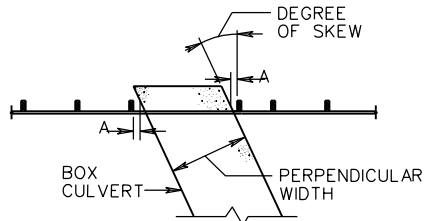
ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 1 OF 2

7/11 501.09



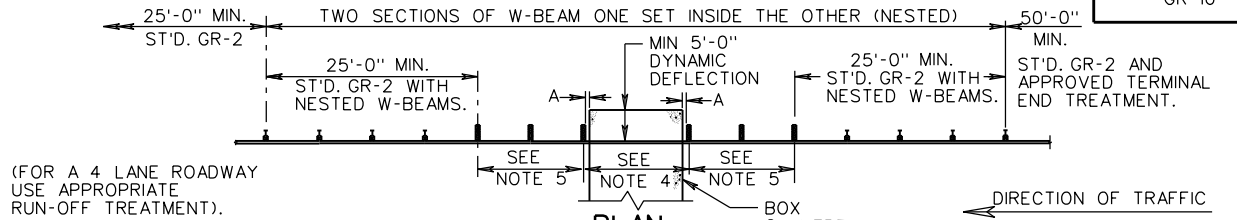
CRT POST WITH DOUBLE BLOCKOUTS



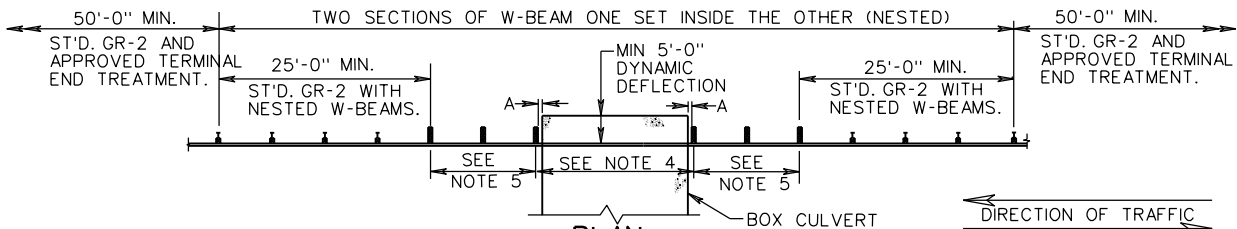
THREE POSTS OMITTED TOP VIEW

TYPE III-THREE POSTS OMITTED		
SKEW	A*	MAX. PERPENDICULAR WIDTH (FEET)
0°	9"	23.00
5°	9"	22.90
10°	9"	22.60
15°	9"	22.10
20°	9"	21.40
25°	9"	20.60
30°	9"	19.60
35°	9"	18.40
40°	9"	17.10
45°	9"	15.60

* "A" THE MINIMUM ALLOWABLE DISTANCE BETWEEN CLOSEST POINT OF POST TO STRUCTURE.



ELEVATION ONE WAY TRAFFIC TYPE III THREE POSTS OMITTED



ELEVATION TWO WAY TRAFFIC TYPE III THREE POSTS OMITTED

NOTES:

1. THIS SHEET IS APPLICABLE WHEN GUARDRAIL IS REQUIRED AND THE DEPTH OF FILL ABOVE THE TOP SLAB OF THE BOX CULVERT IS LESS THAN 4'-0".
2. GUARDRAIL INSTALLATION SHALL BE IN ACCORDANCE WITH SECTION 505 OF THE SPECIFICATIONS. MATERIAL REQUIREMENT FOR COMPONENTS SHALL BE IN ACCORDANCE WITH SECTION 221 OF THE SPECIFICATIONS.
3. GUARDRAIL POST SPACING SHALL BE IN ACCORDANCE WITH STANDARD GR-2.
4. TWO NESTED W-BEAM GUARDRAILS, SEE TABLE FOR ALLOWABLE WIDTHS (25'-0" MAXIMUM).
5. TWO NESTED W-BEAM GUARDRAILS, CRT WOODPOST, 6'-3" SPACING, WITH TWO 6"x8"x14" WOOD OR RECYCLED MATERIAL BLOCKOUTS.
6. ALL SPLICES IN NESTED W-BEAM SECTIONS MUST COINCIDE AT A COMMON POINT AND BE BOLTED TOGETHER USING ONE SET OF BOLTS AT EACH SPLICE.

SPECIFICATION REFERENCE

221
505

GUARDRAIL AT LOW-FILL CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

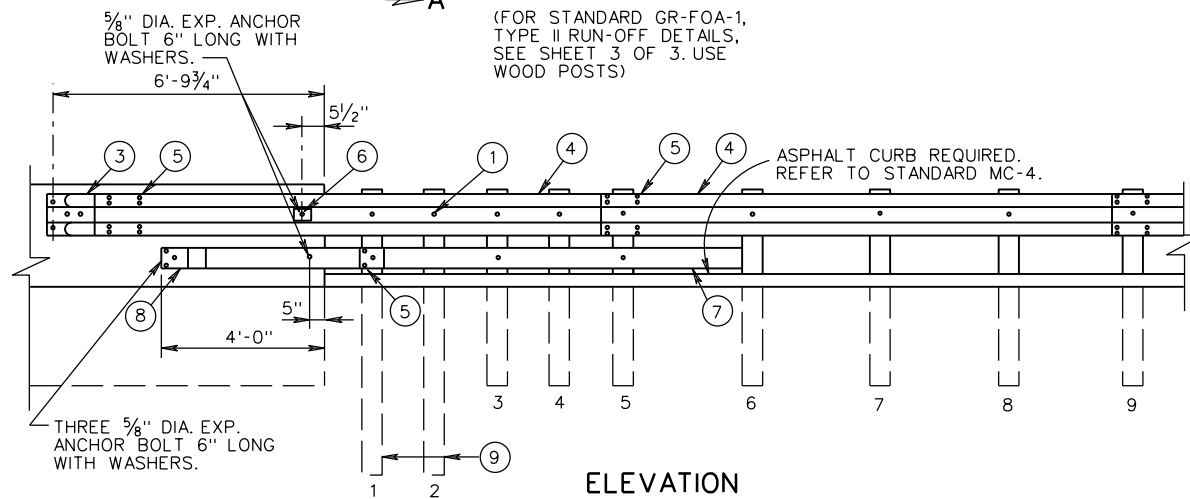
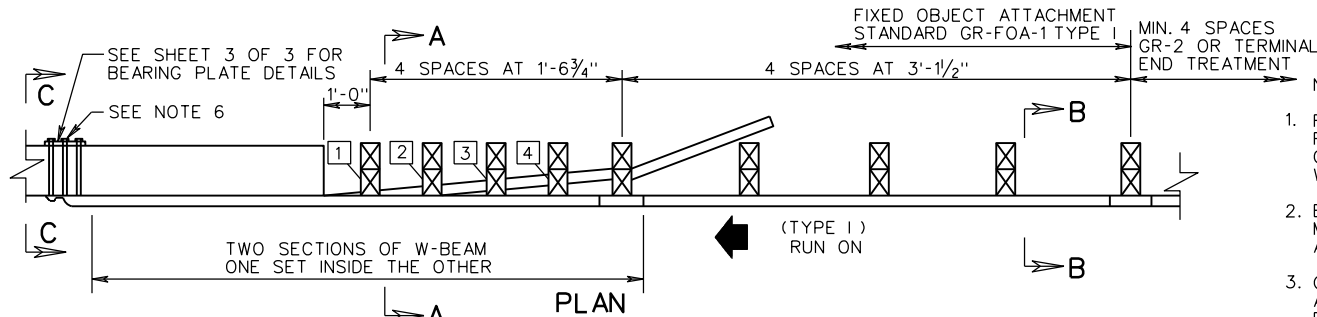
ROAD AND BRIDGE STANDARDS

REVISION DATE

7/11

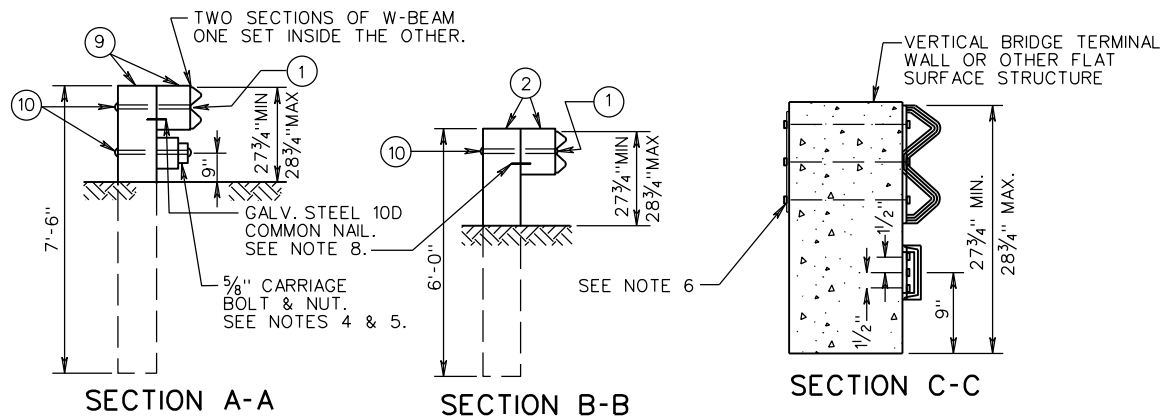
SHEET 2 OF 2

501.19



- NOTES:
1. FIXED OBJECTS MAY CONSIST OF BRIDGE RAILS, ABUTMENTS, PIERS, RETAINING WALLS, OR OTHER FLAT SURFACED STRUCTURES WITH VERTICAL FACE.
 2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
 3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
 4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
 5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS (LENGTH AS REQUIRED).
 6. APPROPRIATE LENGTH 7/8" DIAMETER ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A 5/8" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR TERMINAL WALL.
 7. DRIVE NAIL WITHIN 2" OF THE TOP OR BOTTOM OF THE BLOCKOUT AFTER 5/8" X 18 BOLT IS INSTALLED.
 8. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

NEW BRIDGES - ATTACHMENTS
 ONE WAY TRAFFIC - RUN-ON, 2-GR-FOA-1, TYPE I
 - RUN-OFF, 2-GR-FOA-1, TYPE II
 TWO WAY TRAFFIC - RUN-ON, 4-GR-FOA-1, TYPE I
 EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

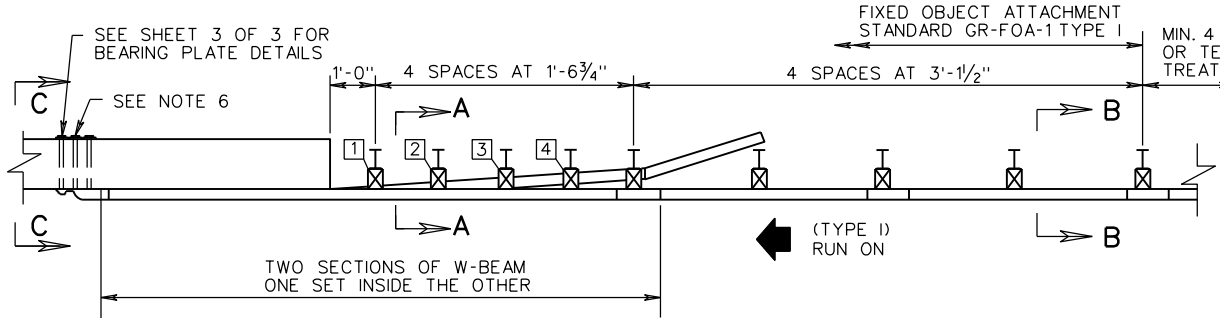


ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	5/8" X 18" LONG. GUARDRAIL BOLT AND RECESSED NUT
②	STANDARD 6" X 8" WOOD POST AND BLOCK
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	5/8" X 2" LONG GUARDRAIL BOLT & RECESSED NUT (SEE ST'D. GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE ST'D. GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	8" X 8" X 7'-6" LONG WOOD POST & 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
⑩	WASHER FOR 5/8" BOLT

SPECIFICATION REFERENCE
505

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
 FOR USE BETWEEN VERTICAL FIXED OBJECTS AND GUARDRAIL (WOOD POSTS)
 VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 7/11	SHEET 1 OF 3 501.25

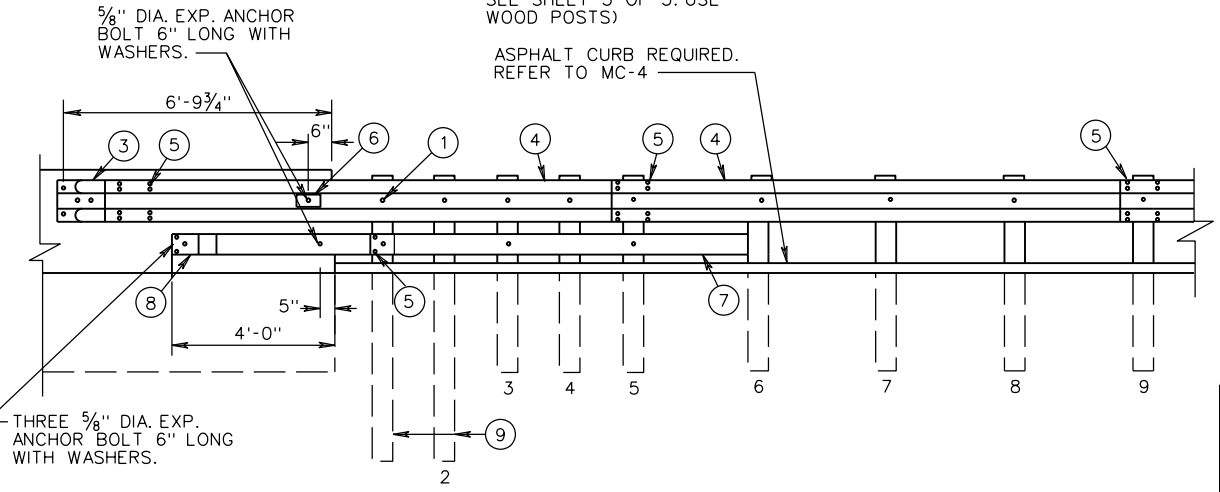


PLAN

(FOR STANDARD GR-FOA-1, TYPE II RUN-OFF DETAILS, SEE SHEET 3 OF 3. USE WOOD POSTS)

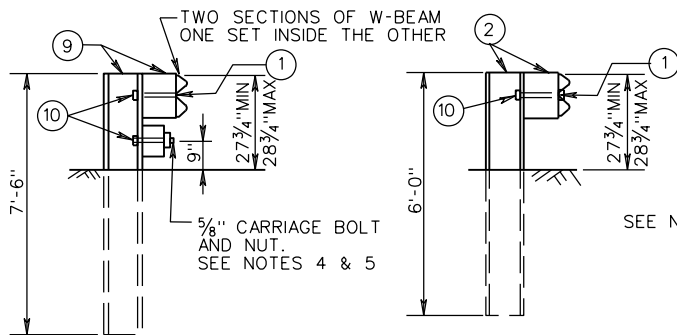
NOTES:

1. FIXED OBJECTS MAY CONSIST OF BRIDGE RAILS, ABUTMENTS, PIERS, RETAINING WALLS, OR OTHER FLAT SURFACED STRUCTURES WITH VERTICAL FACE.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS (LENGTH AS REQUIRED).
6. APPROPRIATE LENGTH 7/8" DIAMETER ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A 5/8" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR TERMINAL WALL.
7. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.



ELEVATION

NEW BRIDGES - ATTACHMENTS
 ONE WAY TRAFFIC - RUN-ON, 2-GR-FOA-1, TYPE I
 - RUN-OFF, 2-GR-FOA-1, TYPE II
 TWO WAY TRAFFIC - RUN-ON, 4-GR-FOA-1, TYPE I



SECTION A-A

SECTION B-B

SECTION C-C

ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	5/8" X 10" LONG HEX BOLT WITH NUT
②	ST'D. W6X8.5 OR W6X9 STEEL POST ST'D. 6X8X14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	5/8" X 2" LONG GUARDRAIL BOLT & RECESSED NUT (SEE STANDARD GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE ST'D. GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	W8 X 13 X 7'-6" LONG STEEL POST WITH STANDARD 6" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
⑩	WASHER FOR 5/8" BOLT



ROAD AND BRIDGE STANDARDS

W-BEAM GUARDRAIL-FIXED OBJECT ATTACHMENT
 FOR USE BETWEEN VERTICAL FIXED OBJECTS AND GUARDRAIL (STEEL POSTS)

SPECIFICATION
 REFERENCE

SHEET 2 OF 3

REVISION DATE

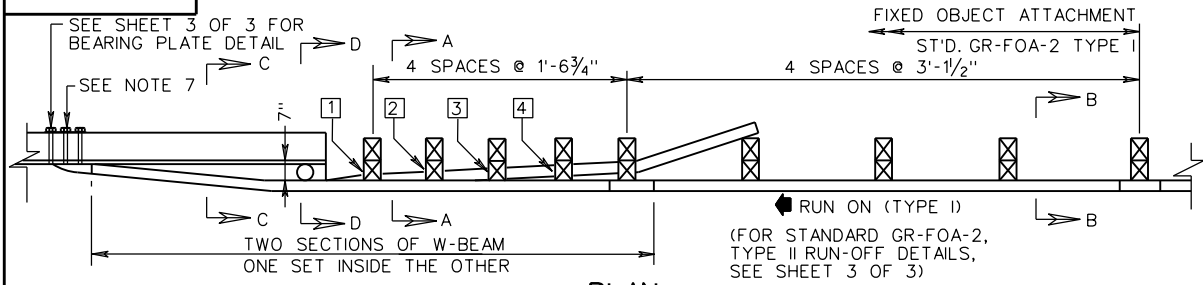
VIRGINIA DEPARTMENT OF TRANSPORTATION

501.26

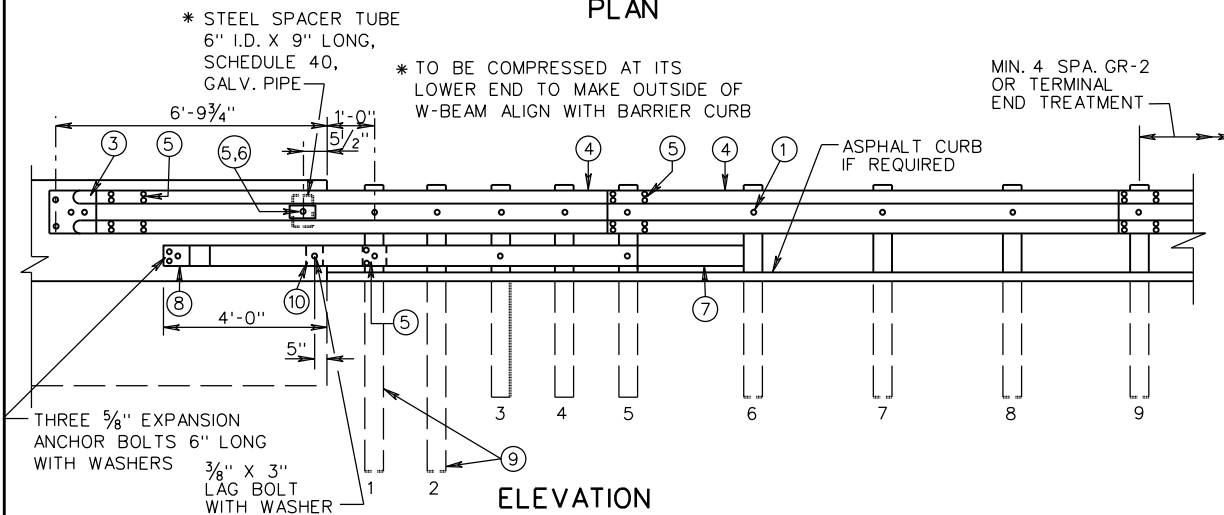
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505

GR-FOA-2



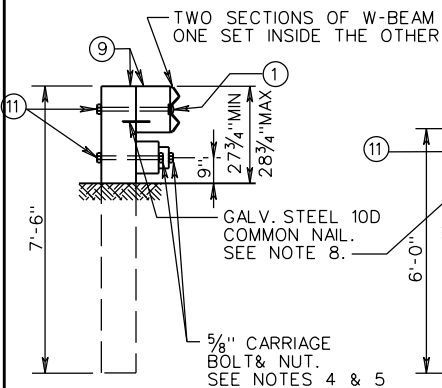
PLAN



ELEVATION

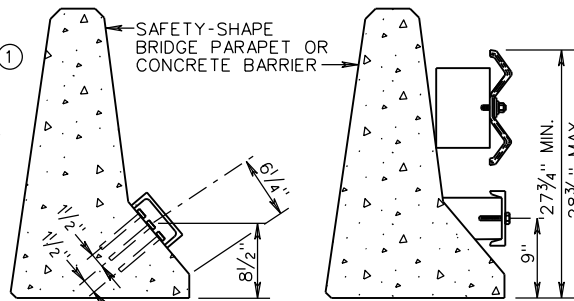
NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.

NEW BRIDGE - ATTACHMENTS
ONE-WAY TRAFFIC-RUN-ON, 2-GR-FOA-2, TYPE I
-RUN-OFF, 2-GR-FOA-2, TYPE II
TWO-WAY TRAFFIC-RUN-ON, 4-GR-FOA-2, TYPE I
EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.



SECTION A-A

SECTION B-B



SECTION C-C

SECTION D-D

NOTES:

1. FIXED OBJECTS MAY CONSIST OF SAFETY SHAPED BRIDGE PARAPETS OR CONCRETE BARRIERS.
2. BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
3. GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
4. POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
5. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
6. RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.
7. APPROPRIATE LENGTH 7/8" ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A 5/8" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR CONCRETE BARRIER.
8. DRIVE NAIL WITHIN 2" OF THE TOP OR BOTTOM OF BLOCKOUT AFTER 5/8" X 18 BOLT IS INSTALLED.
9. SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	5/8" X 18" LG. GUARDRAIL BOLT AND RECESSED NUT.
②	STANDARD 6" X 8" WOOD POST AND BLOCK.
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	5/8" X 2" LONG GUARDRAIL BOLT AND RECESSED NUT (SEE STANDARD GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	8" X 8" X 7'-6" LONG WOOD POST AND 8" X 8" X 14" LONG TREATED PINE BLOCK OR RECYCLED MATERIAL
⑩	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
⑪	WASHER FOR 5/8" BOLT



ROAD AND BRIDGE STANDARDS

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE BETWEEN SAFETY SHAPE AND GUARDRAIL (WOOD POSTS)

SPECIFICATION REFERENCE

SHEET 1 OF 3

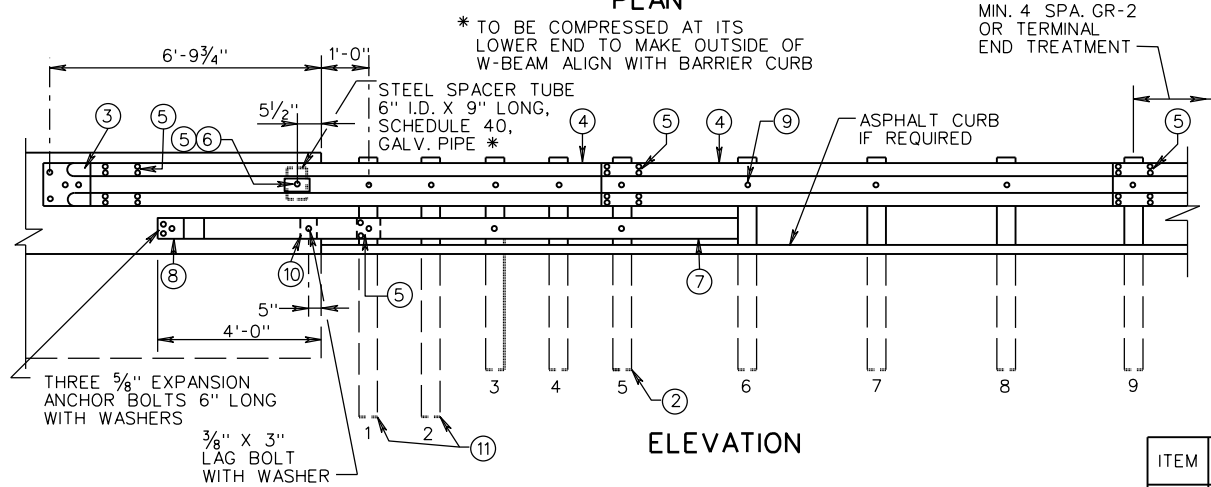
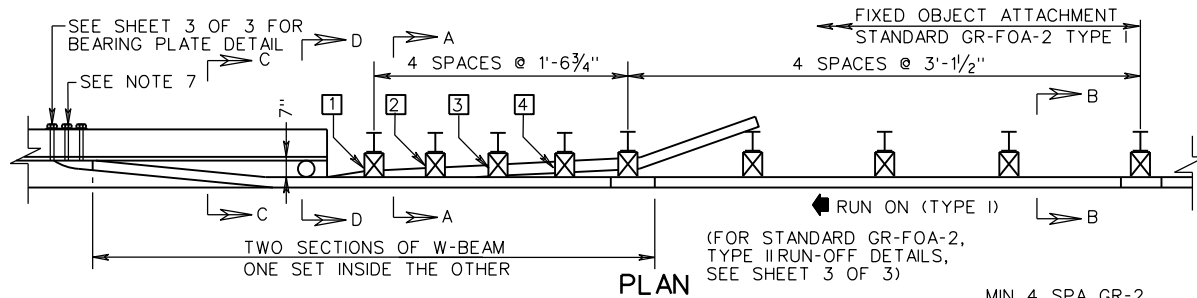
REVISION DATE

VIRGINIA DEPARTMENT OF TRANSPORTATION

501.28

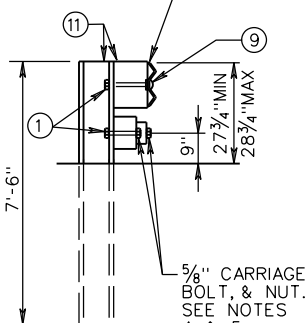
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505

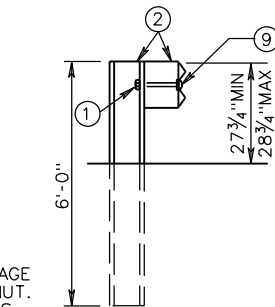


NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.

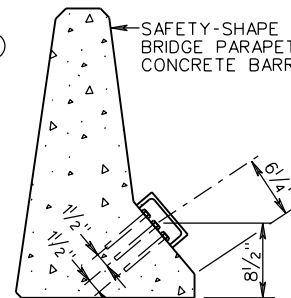
TWO SECTIONS OF W-BEAM
ONE SET INSIDE THE OTHER



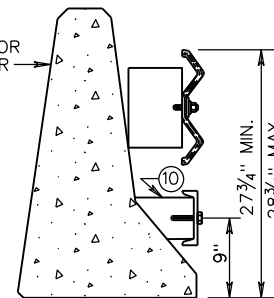
SECTION A-A



SECTION B-B



SECTION C-C
(W BEAM OMITTED)



SECTION D-D

NEW BRIDGE - ATTACHMENTS
ONE-WAY TRAFFIC-RUN-ON, 2-GR-FOA-2, TYPE I
-RUN-OFF, 2-GR-FOA-2, TYPE II
TWO-WAY TRAFFIC-RUN-ON, 4-GR-FOA-2, TYPE I

EXISTING BRIDGE ATTACHMENTS AS SHOWN ON PLANS.

NOTES:

- FIXED OBJECTS MAY CONSIST OF SAFETY SHAPED BRIDGE PARAPETS OR CONCRETE BARRIERS.
- BRIDGE RAIL ENDS AND BRIDGE PARAPETS MUST BE OF ADEQUATE STRENGTH TO ACCEPT FULL IMPACT LOADING.
- GUARDRAIL COMPONENTS SHALL BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
- POSTS 1, 2, 3, 4, AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
- BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE CENTER DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS. (LENGTH AS REQUIRED).
- RUBRAIL MUST BE TWISTED 35° BETWEEN SECTIONS C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED. RIGHT HAND AND LEFT HAND TWISTS WILL BE NECESSARY.
- APPROPRIATE LENGTH 7/8" ASTM A325 HEX BOLTS WITH WASHERS MUST BE USED WITH THRU DRILLED HOLES WITH A 5/8" BEARING PLATE ON THE BACK SIDE OF THE BRIDGE PARAPET OR CONCRETE BARRIER.
- SEE SHEET 3 OF 3 FOR RUBRAIL BLOCKOUT DETAILS.

ITEM	MATERIAL/SPECIFICATIONS/NOTES
①	WASHER FOR 5/8" BOLT
②	ST'D. W6 X 8.5 OR W6 X 9 STEEL POST W/ ST'D. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL
③	STANDARD W-BEAM TERMINAL CONNECTOR
④	STANDARD W-BEAM RAIL
⑤	5/8" X 2" LONG GUARDRAIL BOLT AND RECESSED NUT (SEE STANDARD GR-HDW)
⑥	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
⑦	BENT PLATE RUBRAIL (SEE SHEET 3 OF 3)
⑧	C6 X 8.2 RUBRAIL (SEE SHEET 3 OF 3)
⑨	5/8" X 10" LG. HEX BOLT, NUT AND WASHER
⑩	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 3 OF 3)
⑪	W8 X 13 X 7'-6" LG. STEEL POST WITH STD. 6" X 8" X 14" LG. TREATED PINE BLOCK OR RECYCLED MATERIAL.

SPECIFICATION REFERENCE

505

W-BEAM GUARDRAIL - FIXED OBJECT ATTACHMENT
FOR USE WITH SAFETY SHAPE - (STEEL POSTS)

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

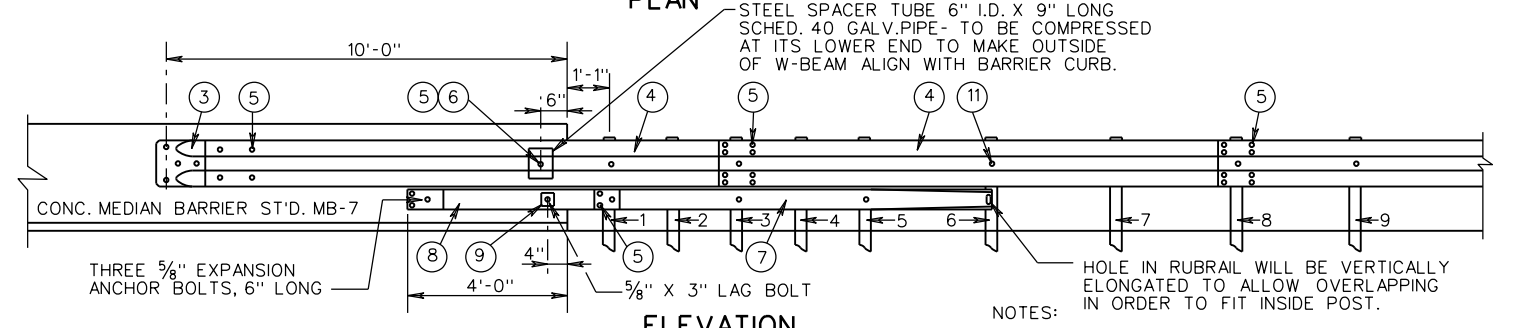
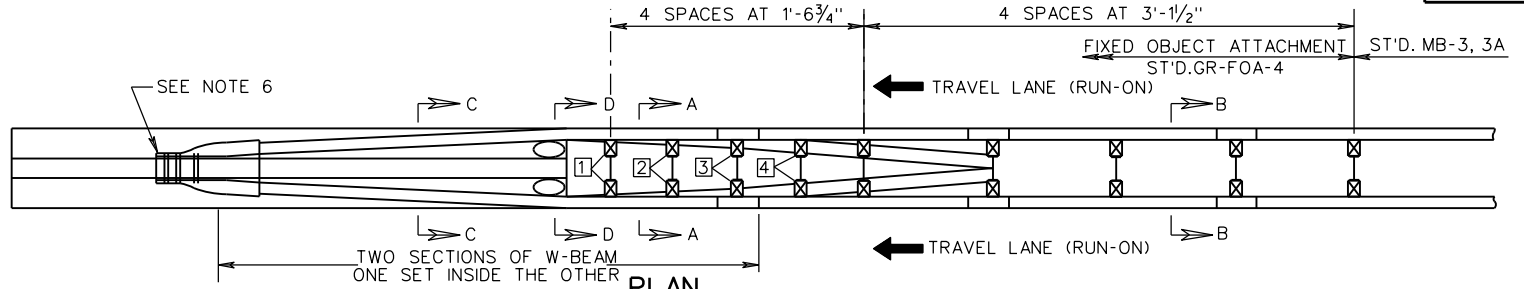
ROAD AND BRIDGE STANDARDS

REVISION DATE

7/11

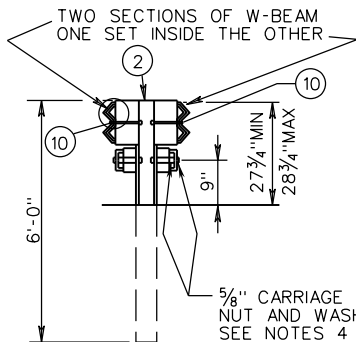
SHEET 2 OF 3

501.29

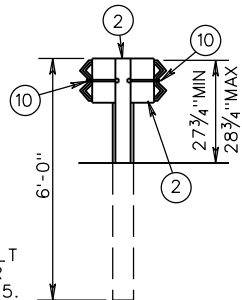


NOTE:
RUBRAIL MUST BE TWISTED 35° BETWEEN SECTIONS
C-C AND D-D. SHOP FABRICATION MAY BE REQUIRED.
RIGHT AND LEFT HAND TWISTS WILL BE REQUIRED.

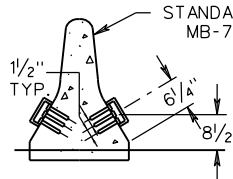
- NOTES:
1. ARE GUARDRAIL POSTS ARE TO BE STEEL.
 2. ALL GUARDRAIL COMPONENTS ARE TO BE IN ACCORDANCE WITH VDOT ROAD AND BRIDGE STANDARDS.
 3. POSTS 1, 2, 3, 4 AND 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL. RUBRAIL IS NOT BOLTED TO POSTS 2 AND 4.
 4. BOTTOM WOOD BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE TO BE DRILLED AND SECURED WITH 5/8" CARRIAGE BOLTS (LENGTH AS REQUIRED)
 5. W-BEAM IS NOT BOLTED TO POSTS 2, 4, 5 AND 7. THESE BLOCKS ARE TO BE BOLTED DIRECTLY TO POSTS.
 6. APPROPRIATE LENGTH 7/8" ASTM A325 HEX BOLTS ARE TO BE USED WITH HOLES DRILLED THROUGH THE CONCRETE MEDIAN BARRIER, ATTACHING THE W-BEAM TERMINAL CONNECTORS ON EACH SIDE.



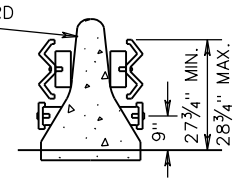
SECTION A-A
(ONE RAIL OMITTED)



SECTION B-B
(ONE RAIL OMITTED)



SECTION C-C
(W-BEAM OMITTED)



SECTION D-D

RUBRAIL WOOD BLOCKS 7" x 4"	
POST	THICKNESS
1	4 1/4"
2	3 3/4"
3	2"
4	1"

ITEM	MATERIALS/SPECIFICATIONS/NOTES	ITEM	MATERIALS/SPECIFICATIONS/NOTES
1	5/8" WASHER	6	RECTANGULAR PLATE WASHER (SEE STANDARD GR-HDW)
2	ST'D. W6 X 8.5 OR W6 X 9 STEEL POSTS, ST'D. 6" X 8" X 14" LONG TREATED PINE BLOCK OR RE-CYCLED MATERIAL.	7	BENT PLATE (SEE SHEET 2 OF 2)
3	ST'D. W-BEAM TERMINAL CONN. (MOD.)	8	C6 x 8.2 RUBRAIL (SEE SHEET 2 OF 2)
4	STANDARD W-BEAM RAIL	9	WOOD BLOCKOUT FOR RUBRAIL (SEE SHEET 2 OF 2)
5	5/8" X 2" LG. GUARDRAIL BOLT AND RECESSED NUT	10	5/8" x 10" LONG HEX BOLT WITH NUT

- TYPE I TWO RUN-ON SECTIONS (WITH 2 RUBRAILS SHOWN)
TYPE II ONE RUN-ON SECTION WITH 1 RUBRAIL RETAINED
ONE RUN-OFF SECTION (WITH 1 RUBRAIL REMOVED)
TYPE III TWO RUN-OFF SECTIONS (WITH 2 RUBRAILS REMOVED)

SPECIFICATION REFERENCE

505

**BLOCKED-OUT W-BEAM MEDIAN
BARRIER-FIXED OBJECT ATTACHMENT**
(FOR USE BETWEEN STANDARD MB-7 AND STANDARD MB-3)
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

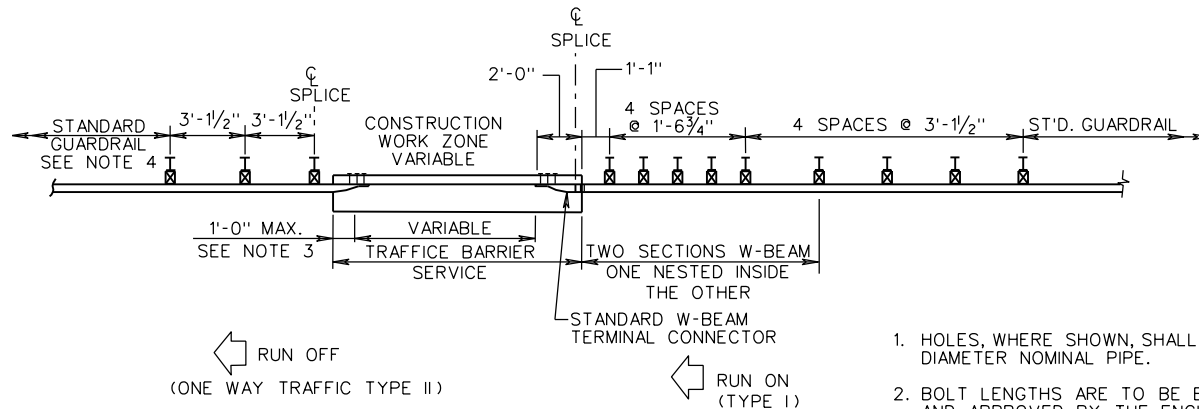
ROAD AND BRIDGE STANDARDS

REVISION DATE

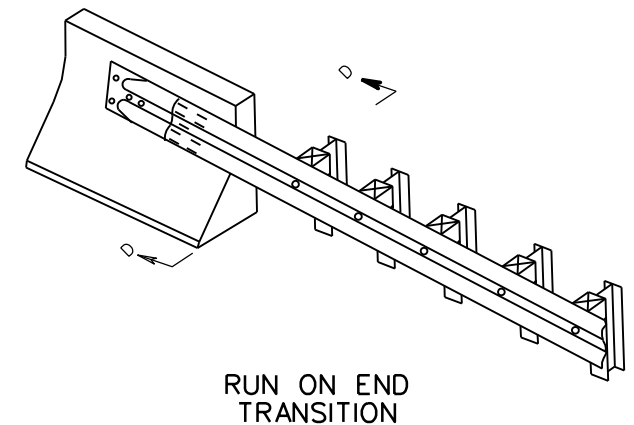
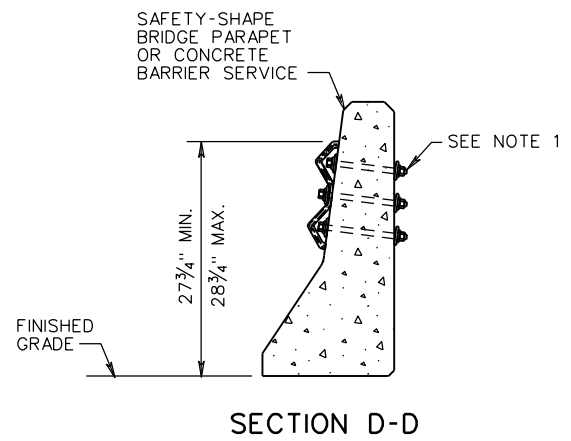
7/11

SHEET 1 OF 2

501.31



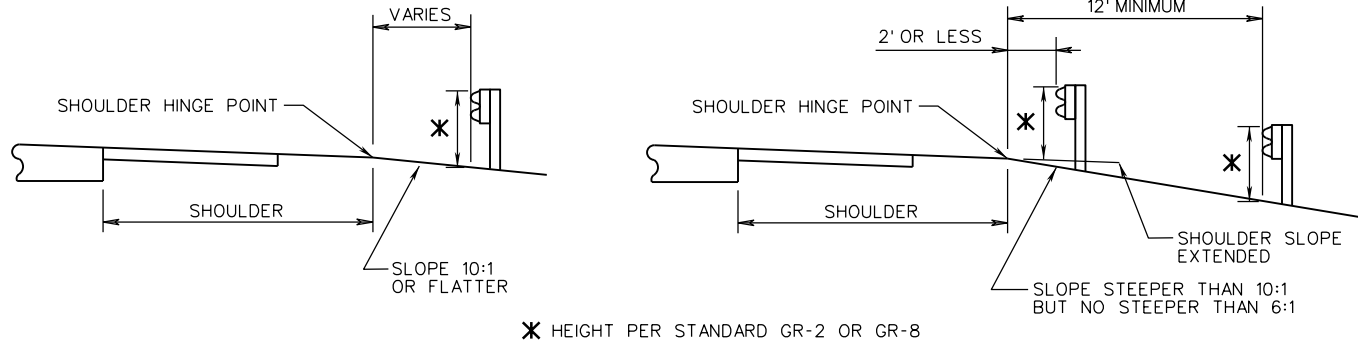
1. HOLES, WHERE SHOWN, SHALL BE FORMED WITH SLEEVES OF 1/2" DIAMETER NOMINAL PIPE.
2. BOLT LENGTHS ARE TO BE ESTABLISHED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. ALL BOLTS ARE TO BE 7/8" DIA. HEX HEAD MACHINE BOLTS WITH BEVELED WASHERS AND SELF-LOCKING NUTS.
3. FOR TWO-WAY TRAFFIC DESIGN, USE RUN-ON END TRANSITION (TYPE I).
4. RUN OFF (TYPE II) GUARDRAIL TO BE USED ONLY WHEN REQUIRED FOR OTHER REASONS.
5. COST OF TRANSITION TO BE INCLUDED IN PRICE BID PER FOOT OF TRAFFICE BARRIER SERVICE CONCRETE.
6. THESE INSTRUCTIONS APPLICABLE FOR TEMPORARY INSTALLATION IN CONSTRUCTION ZONES ONLY. REFER TO STANDARD GR-FOA FOR INSTRUCTIONS ON PERMANENT INSTALLATION.



SPECIFICATION REFERENCE
505

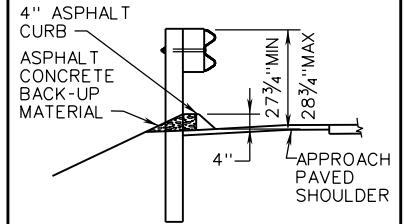
W-BEAM GUARDRAIL INSTALLATION CRITERIA
FIXED OBJECT ATTACHMENT METHODS FOR CONSTRUCTION ZONES
 VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 7/11	SHEET 1 OF 1 501.33

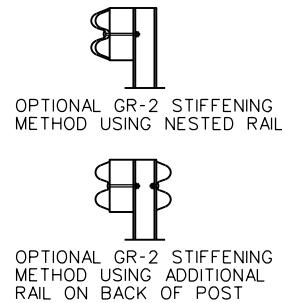
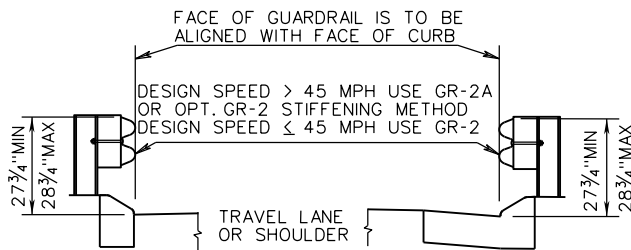


MEASURING GUARDRAIL HEIGHT ON FRONT SLOPE RELATIVE TO SHOULDER HINGE POINT

FACE OF GUARDRAIL IS TO BE ALIGNED WITH FACE OF CURB.
 DESIGN SPEED > 45 MPH
 USE GR-2A OR OPTIONAL GR-2 STIFFENING METHOD.
 DESIGN SPEED ≤ 45 MPH
 USE GR-2.



ASPHALT CURB SECTION



GR-2 INSTALLATION WITH CG-3 OR CG-7 CURB

FOR GUARDRAIL DESIGN POLICIES USING CG-2 AND CG-6 OR URBAN DESIGNS WITH SIDEWALK OR SIDEWALK SPACE SEE APPENDIX A OF THE ROAD DESIGN MANUAL

TABLE I

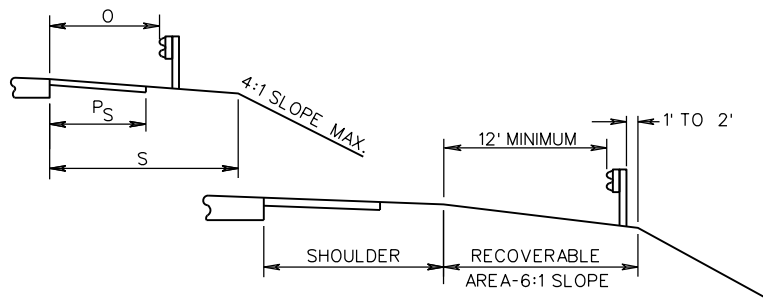
NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES LEFT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (P _S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	3', 4', OR 10'	12'
13'	3'	10'
11'	3'	8'
8' (MED.)	3' or 4'	5'

TABLE II

NORMAL GUARDRAIL LOCATION-THROUGH TRAFFIC LANES RIGHT OF TRAFFIC

TOTAL SHOULDER WIDTH (S) (PAVED & GRADING)	PAVED SHOULDER WIDTH (P _S)	OFFSET FROM EDGE OF PAVEMENT TO FACE OF GUARDRAIL (O)
17'	12'	14'
15'	6' or 10'	12'
13'	8'	10'
11'	0, 3', 4' or 6'	8'
9'	0, 3' or 4'	6'
8'	3'	5'
7'	2'	4'
5'	0	2'



GUARDRAIL LOCATION ON RECOVERABLE SLOPE

SPECIFICATION REFERENCE

221
505

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

W-BEAM GUARDRAIL INSTALLATION CRITERIA

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

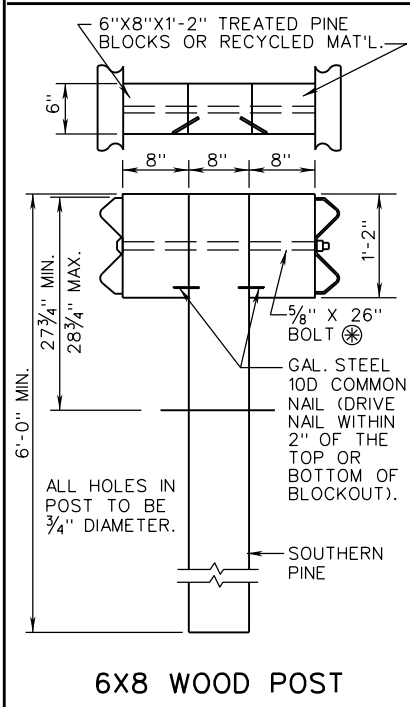
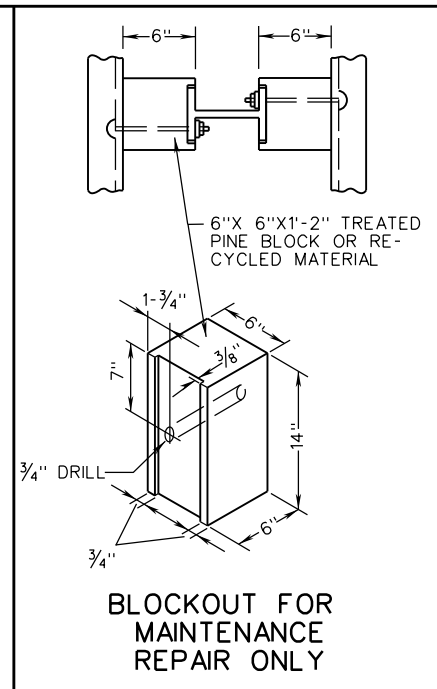
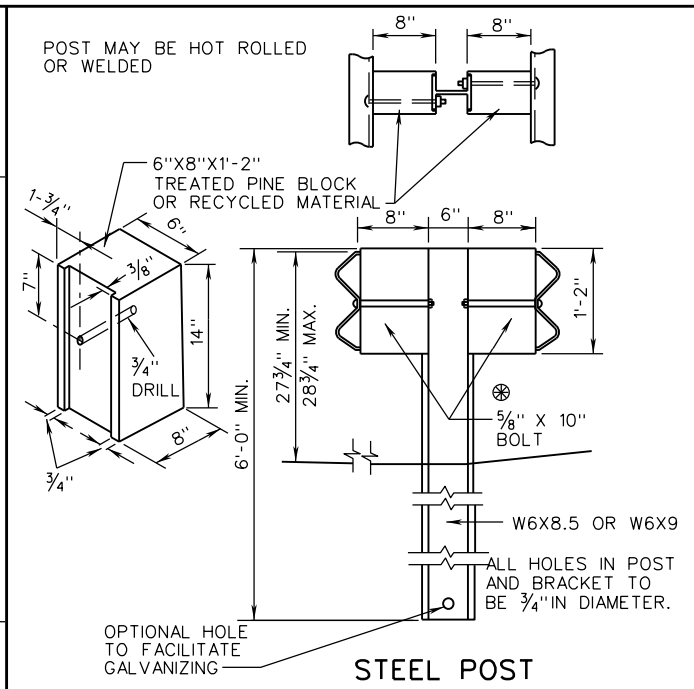
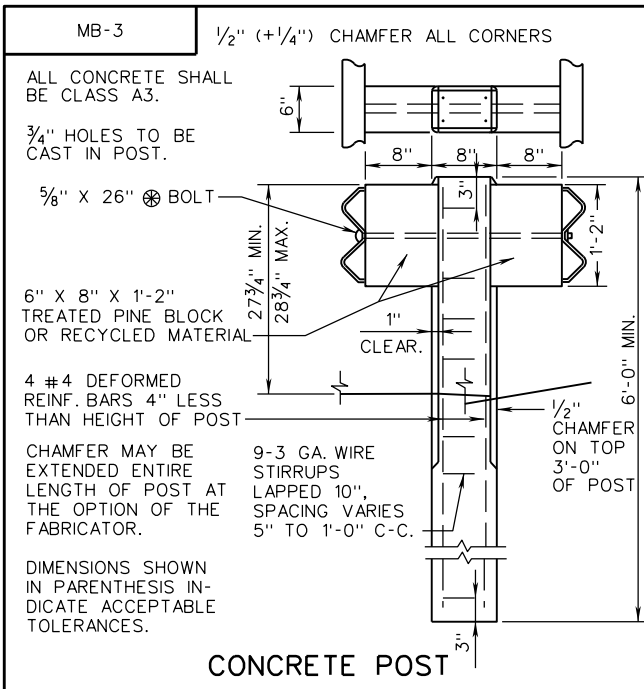
ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 6 OF 9

7/11

501.39



NOTES:
STANDARD MB-3 POST SPACING IS 6'-3".

FOR DETAILS OF RAIL ELEMENT, RAIL SPLICE JOINT, W BEAM BACK UP PLATE, AND ASSOCIATED HARDWARE SEE SHEET NO. 501.01.

ALTERNATE TYPE POSTS AND BLOCKOUTS MAY BE INTERCHANGED ON ANY ONE PROJECT WITH THE RESTRICTION THAT THE SAME TYPE OF POST AND BLOCKOUT MUST BE USED IN ANY SINGLE RUN OF MEDIAN BARRIER.

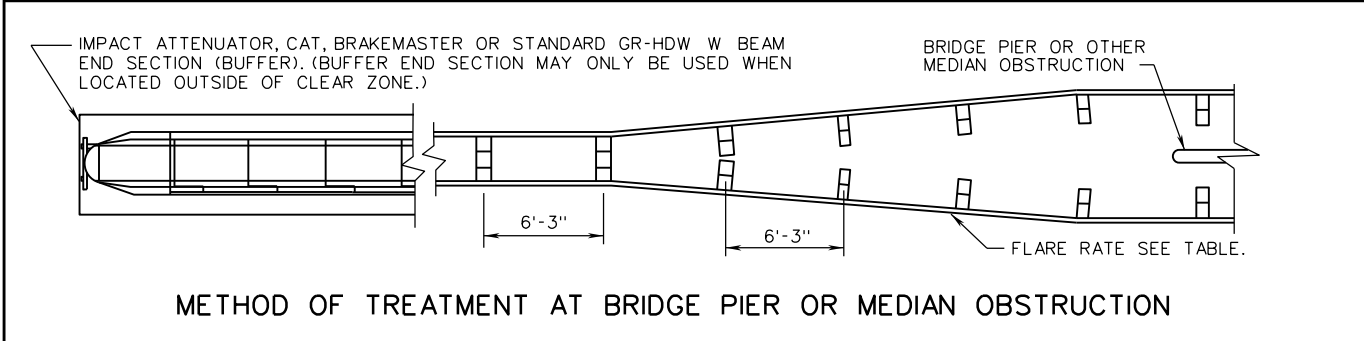
ALL BOLTS, NUTS, WASHERS, STEEL POSTS, BENT PLATE POST, AND BLOCKOUTS ARE TO BE GALVANIZED.

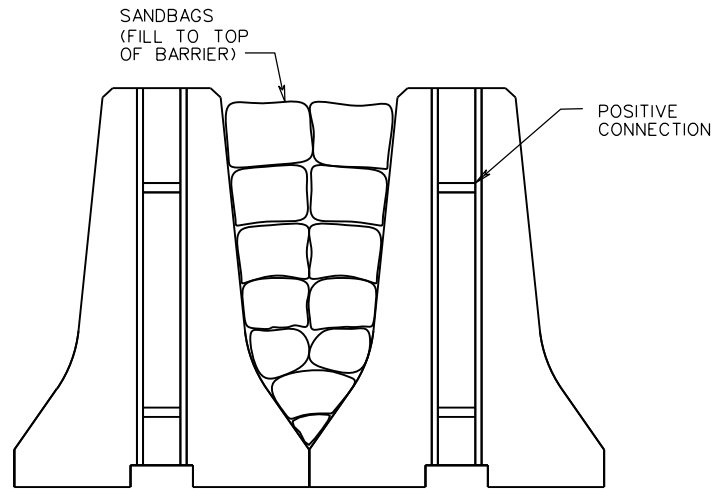
THE GUARDRAIL AND MEDIAN BARRIER COMPONENTS DEPICTED IN A.R.T.B.A. TECHNICAL BULLETIN NUMBER 268B MAY BE SUBSTITUTED IF INTERCHANGEABLE WITH THE STANDARDS FOR GUARDRAIL (GR) OR MEDIAN BARRIER (MB) AND APPROVED BY THE ENGINEER.

⊗ STANDARD WASHERS ARE TO BE USED ON LAST 50' OF RUN OFF END ONLY.

DESIGN SPEED	FLARE RATES		
	INSIDE SHY LINE	BEYOND SHY LINE	
MPH	SHY LINE LS	FLARE RATE	FLARE RATE
70	10'	30:1	15:1 *
60	8'	26:1	14:1 *
50	6.6'	21:1	11:1 *
40	5'	17:1	8:1 *
30	3.6'	13:1	7:1 *

* SUGGESTED MAXIMUM FLARE RATE FOR SEMI-RIGID BARRIER SYSTEMS.



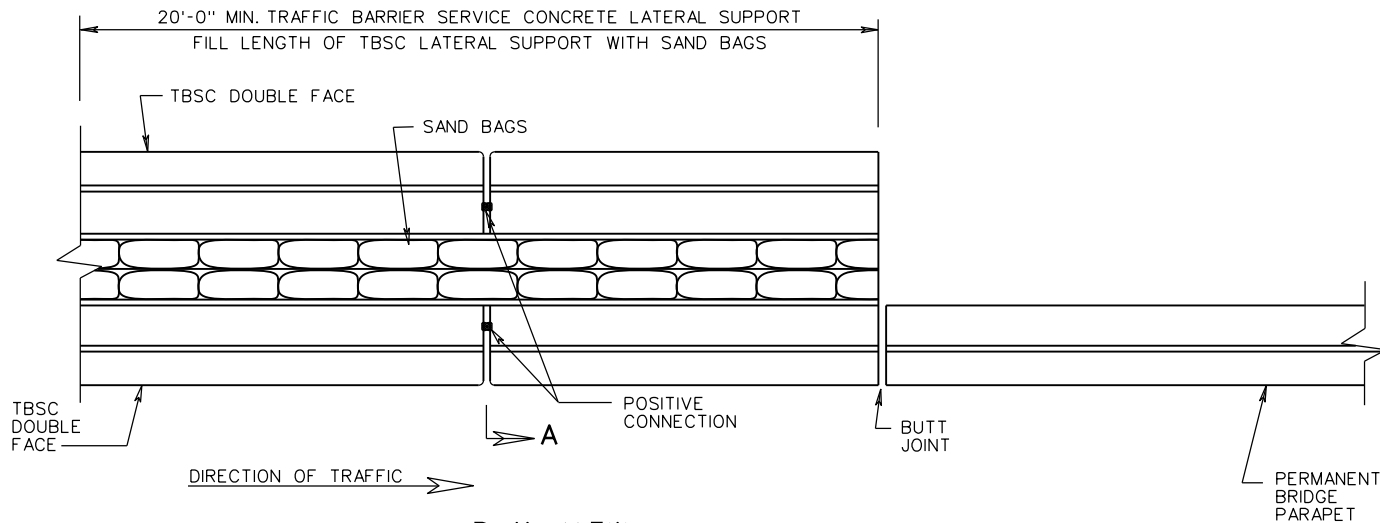


SECTION A-A



NOTES:

1. BASIS OF PAYMENT:
TRAFFIC BARRIER SERVICE LATERAL SUPPORT WILL BE MEASURED AND PAID FOR IN UNITS OF EACH COMPLETE IN PLACE AND SHALL INCLUDE FURNISHING AND PLACING PRECAST CONCRETE BARRIERS (TBS CONCRETE) AND SAND BAGS, MAINTENANCE, REMOVAL WHEN NO LONGER NECESSARY, AND ALL MATERIALS, LABOR, TOOLS, EQUIPMENTS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
2. FOR POSITIVE CONNECTION DETAILS AND DIMENSIONS SEE STANDARD MB-INS, SHEETS 502.20 - 502.22
3. FOR DIMENSIONS NOT SHOWN, REFER TO ST'D. MB-7D AND MB-10A.



PLAN VIEW
METHOD B

SPECIFICATION
REFERENCE

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

**BUTTING TRAFFIC BARRIER SERVICE
TO SINGLE FACE PARAPET SERVICE**

VIRGINIA DEPARTMENT OF TRANSPORTATION



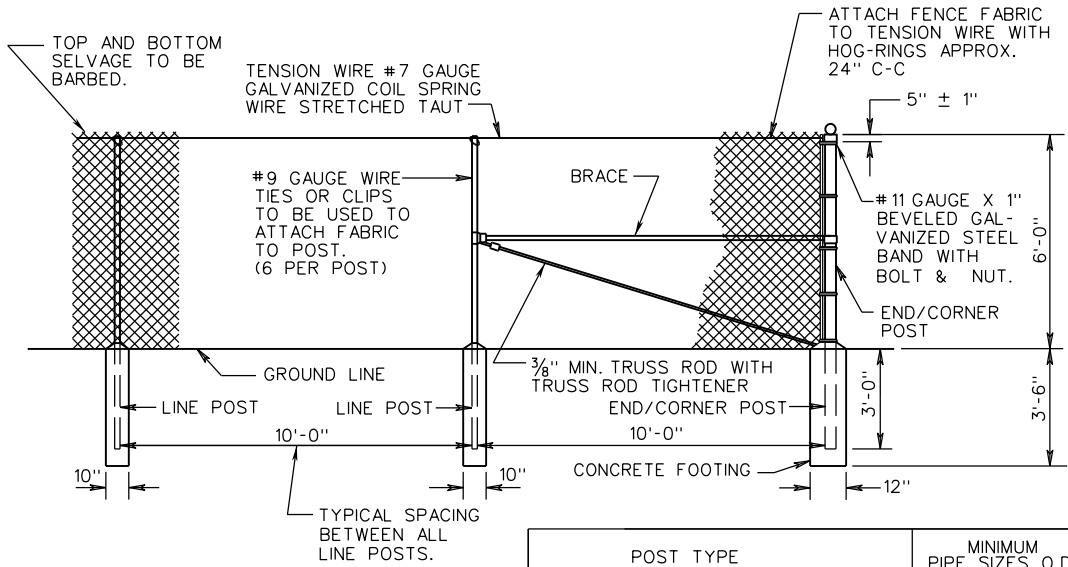
ROAD AND BRIDGE STANDARDS

REVISION DATE

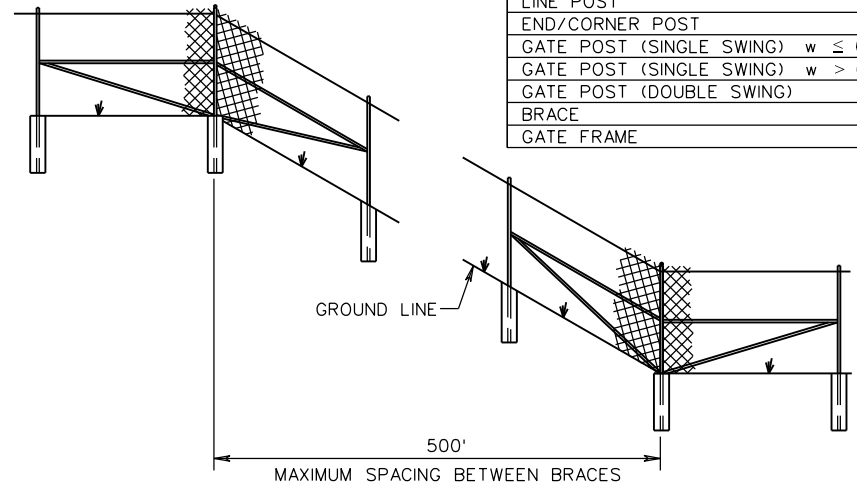
SHEET 5 OF 5

7/11

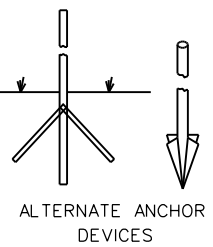
502.24



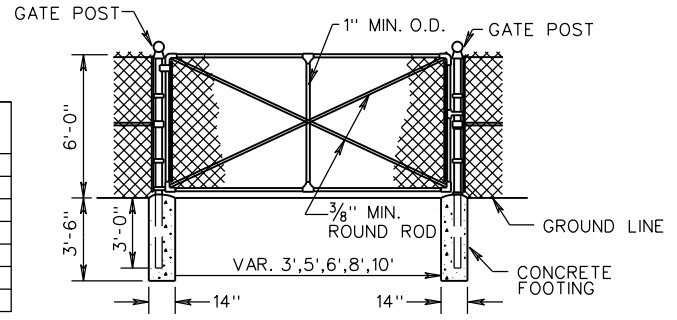
POST TYPE	MINIMUM PIPE SIZES O.D.
LINE POST	2.375"
END/CORNER POST	2.875"
GATE POST (SINGLE SWING) w ≤ 6ft.	2.875"
GATE POST (SINGLE SWING) w > 6ft.	4.00"
GATE POST (DOUBLE SWING)	2.875"
BRACE	1.66"
GATE FRAME	1.90"



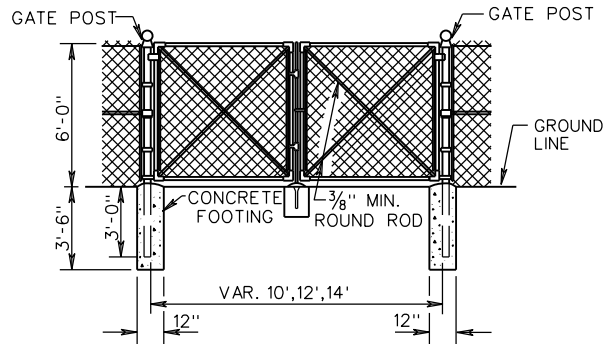
ALTERNATE ANCHOR DEVICES MAY BE USED IN LIEU OF SETTING POST IN CONCRETE. DEVICES SHOWN ARE REPRESENTATIONAL ONLY. SEE GENERAL NOTES.



NOTES:
 SEE GENERAL NOTES-FENCING FOR ADDITIONAL DETAILS AND INSTRUCTIONS
 A MOISTURE-EXCLUDING CAP IS REQUIRED ON TUBULAR POSTS.
 MATERIAL FOR CAP SHALL CONFORM TO THE ALLOWABLE TYPES FOR OTHER LISTED FITTINGS.
 CORNER BRACE - TO BE USED WHEN HORIZONTAL ALIGNMENT CHANGES 15° OR MORE.
 LINE BRACE - TO BE USED WHEN VERTICAL ALIGNMENT CHANGES 15° OR MORE
 END/ CORNER POSTS SHALL BE USED WITH ALL LINE AND CORNER BRACES
 BRACES SHALL BE INSTALLED HALF THE HEIGHT ABOVE THE GROUND LINE OF THE POST WHEN A TOP RAIL IS USED, OR TWO THIRDS THE HEIGHT ABOVE THE GROUND LINE WHEN A TENSION WIRE IS USED IN LIEU OF A TOP RAIL.
 CHAIN LINK FENCE GREATER THAN 6 FEET IN HEIGHT SHALL BE SUBMITTED TO THE STANDARDS & SPECIAL DESIGN SECTION FOR APPROVAL.

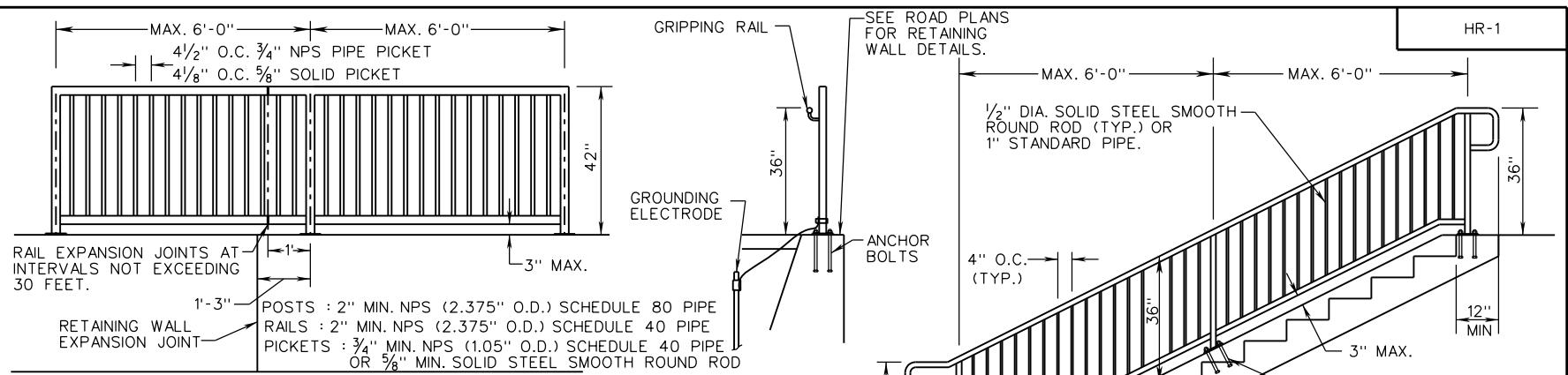


SINGLE SWING GATE

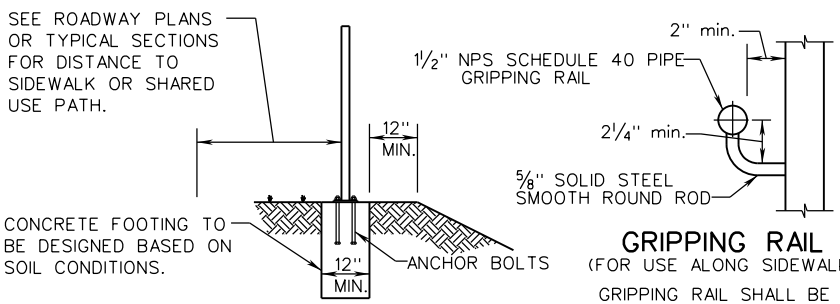


DOUBLE SWING GATE

(TO BE USED WHERE SWINGING CLEARANCE IS LIMITED)

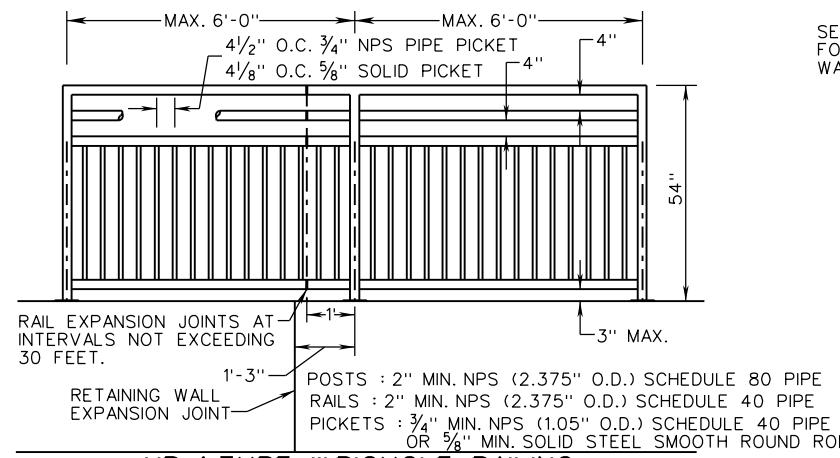


HR-1 TYPE II PEDESTRIAN RAILING
(FOR USE ALONG SIDEWALKS AND RAMPS)

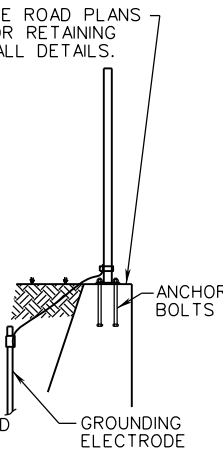


GRIPPING RAIL DETAIL
(FOR USE ALONG SIDEWALKS AND RAMPS)

EARTH FOUNDATION DETAIL
(FOR USE WITH TYPE II & III RAILINGS)



HR-1 TYPE III BICYCLE RAILING
(FOR USE ALONG SHARED USE PATHS)



NOTES

1. THE CONTRATOR SHALL SUBMIT DRAWINGS DETAILING ALL ASPECTS OF FABRICATION AND INSTALLATION OF RAILING, INCLUDING CONCRETE FOUNDATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO INSTALLATION. SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER, HOLDING A VALID LICENSE TO PRACTICE ENGINEERING IN THE COMMONWEALTH OF VIRGINIA.
2. ALL RAILING COMPONENTS AND FASTENERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE CURRENT ROAD AND BRIDGE SPECIFICATIONS. TO ACHIEVE A UNIFORM COATING ON ALL SURFACES VENTING AND DRAINAGE HOLES FOR GALVANIZING SHALL BE INCLUDED IN THE SHOP DRAWINGS.
3. ALL FASTENERS SHALL BE IN ACCORDANCE WITH ASTM A307, ASTM A563, AND ASTM F844. ALL ANCHOR BOLTS SHALL BE IN ACCORDANCE WITH AASHTO M314, GRADE 36.
4. A CHEMICAL ANCHOR SYSTEM FROM VDOT'S APPROVED MATERIAL LIST MAY BE USED IN LIEU OF CAST IN PLACE ANCHORS AND SHALL BE INCLUDED IN THE SHOP DRAWINGS.
5. POSTS SHALL BE MITERED TO MATCH GRADE OF RAMPS, SIDEWALKS, AND STEPS.
6. HANDRAILS SHALL MATCH GRADE OF RAMPS SIDEWALKS AND STEPS.
7. ALL POSTS AND PICKETS SHALL BE SET PLUMB.
8. RAILINGS SHALL BE GROUNDED AND EFFECTIVELY BONDED. GROUNDING MATERIALS INSTALLATION TO BE IN ACCORDANCE WITH ST'D. FE-6.
9. COMMERCIALY AVAILABLE RAILING SYSTEMS MAY BE USED IN LIEU OF DESIGNING AND FABRICATING THE RAILING. DOCUMENTATION FROM THE MANUFACTURER VERIFYING THAT PROJECT REQUIREMENTS ARE MET WITH THE RAILING SYSTEM SHALL BE SUBMITTED WITH THE INSTALLATION DRAWINGS AND APPROVED BY THE ENGINEER IN ACCORDANCE WITH NOTE 1.
10. HANDRAIL TO BE IN ACCORDANCE WITH THE LATEST EDITION OF THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE.
11. THIS HANDRAIL IS TO BE USED ONLY AS A PROTECTION FOR PEDESTRIANS AND SHOULD NOT BE PLACED IN ANY LOCATION WHERE IT MIGHT BE SUBJECT TO ANY VEHICULAR IMPACT. FOR VEHICULAR PROTECTION STANDARD GUARDRAIL SHOULD BE USED.

SPECIFICATION REFERENCE
105
238
504

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

STANDARD HANDRAIL
METHOD OF LOCATING AND ERECTING
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT	
ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 1
7/11	601.05

NOTE: Lr, Lr & w VALUES IN FEET. LISTED RADIUS IS THE MINIMUM ALLOWABLE RADIUS FOR THE CORRESPONDING E, Lt, Lr, AND w VALUES.

TC-5.01

DESIGN FACTORS FOR A DESIGN SPEED OF 80 MPH (RURAL) USING E= 8% MAX.

DESIGN VELOCITY +80	DESIGN SOFTWARE EQUIVALENTS (NUMBER OF LANES AT LANE WIDTH)								WIDTH-72 FT INTERCHANGE RAMPS											
	1 @ 9'		1 @ 10'		1 @ 11'		1 @ 12'		2 @ 12'		3 @ 12'		16 FT		18 FT					
	W	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	W	Lr	Lt	W	Lr	Lt	
	WIDTH+18 FT	WIDTH+20 FT	WIDTH+24 FT	WIDTH+22 FT	WIDTH+24 FT	WIDTH+48 FT	WIDTH+48 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT	WIDTH+72 FT
RADIUS(FT)	E(%)	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	Lt	Lr	
20000	NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
13704	2	52	52	0	58	58	0	63	63	0	69	69	0	72	72	0	83	83	86	
12749	2.1	52	54	0	58	60	0	63	66	0	69	72	0	103	108	0	138	145	150	
12340	2.2	52	57	0	58	63	0	63	70	0	69	76	0	103	114	0	138	152	159	
11845	2.3	52	60	0	58	66	0	63	73	0	69	79	0	103	119	0	138	159	166	
11401	2.4	52	62	0	58	69	0	63	76	0	69	83	0	103	124	0	138	166	173	
10706	2.5	52	65	0	58	72	0	63	79	0	69	86	0	103	129	0	138	173	180	
10251	2.6	52	67	0	58	75	0	63	82	0	69	90	0	103	134	0	138	180	187	
9831	2.7	52	70	0	58	78	0	63	85	0	69	93	0	103	139	0	138	187	194	
9528	2.8	52	72	0	58	80	0	63	88	0	69	96	0	103	144	0	138	193	200	
9163	2.9	52	75	0	58	83	0	63	92	0	69	100	0	103	150	0	138	200	207	
8904	3	52	78	0	58	86	0	63	95	0	69	103	0	103	155	0	138	207	214	
8584	3.1	52	80	0	58	89	0	63	98	0	69	107	0	103	160	0	138	214	221	
8358	3.2	52	83	0	58	92	0	63	101	0	69	110	0	103	165	0	138	221	228	
8148	3.3	52	85	0	58	95	0	63	104	0	69	114	0	103	170	0	138	228	235	
7881	3.4	52	88	0	58	98	0	63	107	0	69	117	0	103	175	0	138	235	242	
7490	3.5	52	90	0	58	100	0	63	110	0	69	120	0	103	180	0	138	242	249	
7319	3.6	52	93	0	58	103	0	63	114	0	69	124	0	103	186	0	138	249	256	
7096	3.7	52	96	0	58	106	0	63	117	0	69	127	0	103	191	0	138	256	263	
6883	3.8	52	98	0	58	109	0	63	120	0	69	131	0	103	196	0	138	263	270	
6743	3.9	52	101	0	58	112	0	63	123	0	69	134	0	103	201	0	138	269	276	
6550	4	52	103	0	58	115	0	63	126	0	69	138	0	103	206	0	138	276	283	
6367	4.1	52	106	0	58	118	0	63	129	0	69	141	0	103	211	0	138	283	290	
6193	4.2	52	108	0	58	120	0	63	132	0	69	144	0	103	216	0	138	290	297	
6038	4.3	52	111	0	58	123	0	63	136	0	69	148	0	103	222	0	138	297	304	
5868	4.4	52	114	0	58	126	0	63	139	0	69	151	0	103	227	0	138	304	311	
5820	4.5	52	116	0	58	129	0	63	142	0	69	155	0	103	232	0	138	311	318	
5656	4.6	52	119	0	58	132	0	63	145	0	69	158	0	103	237	0	138	318	324	
5499	4.7	52	121	0	58	135	0	63	148	0	69	162	0	103	242	0	138	324	329	
5405	4.8	52	124	0	58	138	0	63	151	0	69	165	0	103	247	0	138	331	334	
5274	4.9	52	126	0	58	140	0	63	154	0	69	168	0	103	252	0	138	338	338	
5150	5	52	129	0	58	143	0	63	158	0	69	172	0	103	258	0	138	345	348	
5067	5.1	52	132	0	58	146	0	63	161	0	69	175	0	103	263	0	138	352	354	
4951	5.2	52	134	0	58	149	0	63	164	0	69	179	0	103	268	0	138	359	361	
4775	5.3	52	137	0	58	152	0	63	167	0	69	182	0	103	273	0	138	366	368	
4669	5.4	52	139	0	58	155	0	63	170	0	69	186	0	103	278	0	138	373	375	
4586	5.5	52	142	0	58	158	0	63	173	0	69	189	0	103	283	0	138	380	381	
4497	5.6	52	144	0	58	160	0	63	176	0	69	192	0	103	288	0	138	386	388	
4410	5.7	52	147	0	58	163	0	63	180	0	69	196	0	103	294	0	138	393	394	
4337	5.8	52	150	0	58	166	0	63	183	0	69	199	0	103	299	0	138	400	401	
4267	5.9	52	152	0	58	169	0	63	186	0	69	203	0	103	304	0	138	407	407	
4227	6	52	155	0	58	172	0	63	189	0	69	206	0	103	309	0	138	414	414	
4146	6.1	52	157	0	58	175	0	63	192	0	69	210	0	103	314	0	138	421	421	
4047	6.2	52	160	0	58	178	0	63	195	0	69	213	0	103	319	0	138	428	428	
3966	6.3	52	162	0	58	180	0	63	198	0	69	216	0	103	324	0	138	435	435	
3877	6.4	52	165	0	58	183	0	63	202	0	69	220	0	103	330	0	138	442	442	
3860	6.5	52	168	0	58	186	0	63	205	0	69	223	0	103	335	0	138	448	448	
3790	6.6	67	170	0	58	189	0	63	208	0	69	227	0	103	340	0	138	455	455	
3723	6.7	66	173	0	58	192	0	63	211	0	69	230	0	103	345	0	138	462	462	
3652	6.8	65	175	0	58	195	0	63	214	0	69	234	0	103	350	0	138	469	469	
3582	6.9	64	178	0	58	198	0	63	217	0	69	237	0	103	355	0	138	476	476	
3513	7	63	180	0	58	200	0	63	220	0	69	240	0	103	360	0	138	483	483	
3467	7.1	62	183	0	58	203	0	63	224	0	69	244	0	103	366	0	138	490	490	
3425	7.2	62	186	0	58	206	0	63	227	0	69	247	0	103	371	0	138	497	497	
3354	7.3	61	188	0	58	209	0	63	230	0	69	251	0	103	376	0	138	504	504	
3324	7.4	60	191	0	58	212	0	63	233	0	69	254	0	103	381	0	138	510	510	
3218	7.5	59	193	0	58	215	0	63	236	0	69	258	0	103	386	0	138	517	517	
3159	7.6	58	196	0	58	218	0	63	239	0	69	261	0	103	391	0	138	524	524	
3115	7.7	58	198	0	58	220	0	63	242	0	69	264	0	103	396	0	138	531	531	
3029	7.8	57	201	0	58	223	0	63	246	0	69	268	0	103	402	0	138	538	538	
2895	7.9	56	204	0	58	226	0	63	249	0	69	271	0	103	407	0	138	545	545	
2675	8	60	238	2.8	58	229	0	63	252	0	69	275	0	103	412	0	138	552	552	



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1

REVISION DATE

802.44

7/11

**TRANSITION CURVES - RURAL
80 MPH DESIGN SPEED**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

STANDARD	TITLE	PAGE
BC-GEN	GENERAL BOX CULVERT ASSUMPTIONS	1000.05
BCB-DT	OVERSIZE BOX CULVERT STANDARD DETAILS	1001.01
	OVERSIZE BOX CULVERT STANDARD DETAILS	1001.02
BCB-02	OVERSIZE BOX CULVERT (0 TO 2 FT. FILLS)	1001.03
BCB-05	OVERSIZE BOX CULVERT (2 TO 5 FT. FILLS)	1001.04
BCB-10	OVERSIZE BOX CULVERT (5 TO 10 FT. FILLS)	1001.05
BCB-20	OVERSIZE BOX CULVERT (10 TO 20 FT. FILLS)	1001.06
BCB-30	OVERSIZE BOX CULVERT (20 TO 30 FT. FILLS)	1001.07
BCB-40	OVERSIZE BOX CULVERT (30 TO 40 FT. FILLS)	1001.08
BCB-50	OVERSIZE BOX CULVERT (40 TO 50 FT. FILLS)	1001.09
BCS-DT	SINGLE BOX CULVERT STANDARD DETAILS	1002.01
	SINGLE BOX CULVERT STANDARD DETAILS	1002.02
BCS-02	SINGLE BOX CULVERT (0 TO 2 FT. FILLS)	1002.03
	SINGLE BOX CULVERT (0 TO 2 FT. FILLS)	1002.04
BCS-05	SINGLE BOX CULVERT (2 TO 5 FT. FILLS)	1002.05
	SINGLE BOX CULVERT (2 TO 5 FT. FILLS)	1002.06
BCS-10	SINGLE BOX CULVERT (5 TO 10 FT. FILLS)	1002.07
	SINGLE BOX CULVERT (5 TO 10 FT. FILLS)	1002.08
BCS-20	SINGLE BOX CULVERT (10 TO 20 FT. FILLS)	1002.09
	SINGLE BOX CULVERT (10 TO 20 FT. FILLS)	1002.10
BCS-30	SINGLE BOX CULVERT (20 TO 30 FT. FILLS)	1002.11
	SINGLE BOX CULVERT (20 TO 30 FT. FILLS)	1002.12
BCS-40	SINGLE BOX CULVERT (30 TO 40 FT. FILLS)	1002.13
	SINGLE BOX CULVERT (30 TO 40 FT. FILLS)	1002.14
BCS-50	SINGLE BOX CULVERT (40 TO 50 FT. FILLS)	1002.15
	SINGLE BOX CULVERT (40 TO 50 FT. FILLS)	1002.16
BCD-DT	DOUBLE BOX CULVERT STANDARD DETAILS	1003.01
	DOUBLE BOX CULVERT STANDARD DETAILS	1003.02
	DOUBLE BOX CULVERT STANDARD DETAILS	1003.03
	DOUBLE BOX CULVERT BLANK SHEET	1003.04
BCD-02	DOUBLE BOX CULVERT (0 TO 2 FT. FILLS)	1003.05
	DOUBLE BOX CULVERT (0 TO 2 FT. FILLS)	1003.06

INDEX OF SHEETS
SECTION 1000-BOX CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 4

07/11

1000.01

STANDARD	TITLE	PAGE
BCD-05	DOUBLE BOX CULVERT (2 TO 5 FT. FILLS)	1003.07
	DOUBLE BOX CULVERT (2 TO 5 FT. FILLS)	1003.08
BCD-10	DOUBLE BOX CULVERT (5 TO 10 FT. FILLS)	1003.09
	DOUBLE BOX CULVERT (5 TO 10 FT. FILLS)	1003.10
BCD-20	DOUBLE BOX CULVERT (10 TO 20 FT. FILLS)	1003.11
	DOUBLE BOX CULVERT (10 TO 20 FT. FILLS)	1003.12
BCD-30	DOUBLE BOX CULVERT (20 TO 30 FT. FILLS)	1003.13
	DOUBLE BOX CULVERT (20 TO 30 FT. FILLS)	1003.14
BCD-40	DOUBLE BOX CULVERT (30 TO 40 FT. FILLS)	1003.15
	DOUBLE BOX CULVERT (30 TO 40 FT. FILLS)	1003.16
BCD-50	DOUBLE BOX CULVERT (40 TO 50 FT. FILLS)	1003.17
	DOUBLE BOX CULVERT (40 TO 50 FT. FILLS)	1003.18
BCT-DT	TRIPLE BOX CULVERT STANDARD DETAILS	1004.01
	TRIPLE BOX CULVERT STANDARD DETAILS	1004.02
	TRIPLE BOX CULVERT STANDARD DETAILS	1004.03
	TRIPLE BOX CULVERT BLANK SHEET	1004.04
BCT-02	TRIPLE BOX CULVERT (0 TO 2 FT. FILLS)	1004.05
	TRIPLE BOX CULVERT (0 TO 2 FT. FILLS)	1004.06
BCT-05	TRIPLE BOX CULVERT (2 TO 5 FT. FILLS)	1004.07
	TRIPLE BOX CULVERT (2 TO 5 FT. FILLS)	1004.08
BCT-10	TRIPLE BOX CULVERT (5 TO 10 FT. FILLS)	1004.09
	TRIPLE BOX CULVERT (5 TO 10 FT. FILLS)	1004.10
BCT-20	TRIPLE BOX CULVERT (10 TO 20 FT. FILLS)	1004.11
	TRIPLE BOX CULVERT (10 TO 20 FT. FILLS)	1004.12
BCT-30	TRIPLE BOX CULVERT (20 TO 30 FT. FILLS)	1004.13
	TRIPLE BOX CULVERT (20 TO 30 FT. FILLS)	1004.14
BCT-40	TRIPLE BOX CULVERT (30 TO 40 FT. FILLS)	1004.15
	TRIPLE BOX CULVERT (30 TO 40 FT. FILLS)	1004.16
BCT-50	TRIPLE BOX CULVERT (40 TO 50 FT. FILLS)	1004.17
	TRIPLE BOX CULVERT (40 TO 50 FT. FILLS)	1004.18
BCQ-DT	QUADRUPLE BOX CULVERT STANDARD DETAILS	1005.01
	QUADRUPLE BOX CULVERT STANDARD DETAILS	1005.02
	QUADRUPLE BOX CULVERT STANDARD DETAILS	1005.03
	QUADRUPLE BOX CULVERT BLANK SHEET	1005.04



ROAD AND BRIDGE STANDARDS

SHEET 2 OF 4

REVISION DATE

1000.02

07.11

INDEX OF SHEETS SECTION 1000-BOX CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

STANDARD	TITLE	PAGE
BCQ-02	QUADRUPLE BOX CULVERT (0 TO 2 FT. FILLS)	1005.05
	QUADRUPLE BOX CULVERT (0 TO 2 FT. FILLS)	1005.06
BCQ-05	QUADRUPLE BOX CULVERT (2 TO 5 FT. FILLS)	1005.07
	QUADRUPLE BOX CULVERT (2 TO 5 FT. FILLS)	1005.08
BCQ-10	QUADRUPLE BOX CULVERT (5 TO 10 FT. FILLS)	1005.09
	QUADRUPLE BOX CULVERT (5 TO 10 FT. FILLS)	1005.10
BCQ-20	QUADRUPLE BOX CULVERT (10 TO 20 FT. FILLS)	1005.11
	QUADRUPLE BOX CULVERT (10 TO 20 FT. FILLS)	1005.12
BCQ-30	QUADRUPLE BOX CULVERT (20 TO 30 FT. FILLS)	1005.13
	QUADRUPLE BOX CULVERT (20 TO 30 FT. FILLS)	1005.14
BCQ-40	QUADRUPLE BOX CULVERT (30 TO 40 FT. FILLS)	1005.15
	QUADRUPLE BOX CULVERT (30 TO 40 FT. FILLS)	1005.16
BCQ-50	QUADRUPLE BOX CULVERT (40 TO 50 FT. FILLS)	1005.17
	QUADRUPLE BOX CULVERT (40 TO 50 FT. FILLS)	1005.18
BCW-11	WING DETAIL 1.5:1 FILL SLOPE - TYPE I - BLANK SHEET (Requires a special design at this time)	1006.01
BCW-12	WING DETAIL 1.5:1 FILL SLOPE - TYPE II - BLANK SHEET (Requires a special design at this time)	1006.02

INDEX OF SHEETS
SECTION 1000-BOX CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE	SHEET 3 OF 4
---------------	--------------

07/11

1000.03

STANDARD	TITLE	PAGE
BCW-21	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.01
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.02
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.03
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.04
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.05
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.06
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.07
	WING DETAIL 2:1 FILL SLOPE - TYPE I	1007.08
BCW-22	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.09
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.10
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.11
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.12
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.13
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.14
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.15
	WING DETAIL 2:1 FILL SLOPE - TYPE II	1007.16
BCE-01	DETAILS FOR WIDENING EXISTING BOX CULVERTS	1008.01
	DETAILS FOR WIDENING EXISTING BOX CULVERTS	THRU 1008.04



ROAD AND BRIDGE STANDARDS

SHEET 4 OF 4

REVISION DATE

1000.04

INDEX OF SHEETS SECTION 1000-BOX CULVERTS

VIRGINIA DEPARTMENT OF TRANSPORTATION

NOTES TO DESIGNER:

The designer shall ensure that the following checks are undertaken to ensure the suitability of the standard box culvert and wingwall designs to a particular site.

General:

The designer shall review the site investigation results and material testing to confirm the site exposure and environment is within the scope of these standards. This includes highly saline environments, maritime environments including splash zones and other aggressive chemicals.

Box Culverts:

The designer shall review the geometry and applied loading of the proposed site to ensure that the design is within the scope of these standards.

AASHTO Crack Control Criteria, Article 5.7.3.4, is ignored.

Wingwalls:

The standard wingwall designs do not allow for increased earth pressure loads due to seismic effects.

The standard wingwall designs are not valid for wingwalls founded on rock. Where wingwalls are to be founded on rock the designer shall ensure the AASHTO LRFD Section 11.6.3.2 and 11.6.3.3 criteria for overturning are satisfied.

The designer shall ensure that the overall slip circle stability and wall deflections are checked in accordance with Section 11.6.2 of AASHTO LRFD.

The designer shall ensure the friction angle for founding stratum, ϕ_{found} , is a minimum of 32 degrees. Where the founding stratum is a cohesive soil, the designer shall ensure that the sliding stability of the wall is verified.

Where the designer proposes to improve the foundation strata to allow the use of the standard wingwall designs, the designer shall ensure that additional sliding and bearing pressure checks are carried out at the base of the improved soil layer.

In locations where it is not practical to provide the back of wall drainage system as indicated on the drawings, the designer shall re-check the wingwall designs taking into account the site groundwater conditions. Special consideration of groundwater conditions may also be required in locations where the watercourse is prone to rapid and significant changes in water level, including seepage effects where appropriate.

The designer shall calculate the nominal bearing resistance of the foundation material using the semi-empirical approach given in AASHTO LRFD Section 10.6.3.1.3 using the width of footing at the low and high ends of the wingwall, dimensions N1 and N2, for the footing width B in formula 10.6.3.1.3-1. The designer shall check that the factored bearing resistance at each end of the wall, q_R , is greater than the minimum values given in the table below. Where the factored bearing resistance is below the minimum values given in the table the designer shall re-design the wall based on an increased footing width or provide improvement to the foundation bearing resistance such that its bearing resistance exceeds the minimum values.

N1 OR N2 (FT.)	$q_{r,min.}$ (ksf)	N1 OR N2 (FT.)	$q_{r,min.}$ (ksf)	N1 OR N2 (FT.)	$q_{r,min.}$ (ksf)
3'-0"	0.64	8'-0"	2.01	13'-0"	3.87
3'-6"	0.62	8'-6"	2.14	13'-6"	4.01
4'-0"	0.75	9'-0"	2.28	14'-0"	4.25
4'-6"	0.89	9'-6"	2.57	15'-0"	4.54
5'-0"	1.09	10'-0"	2.71	16'-0"	4.63
5'-6"	1.21	10'-6"	2.84	16'-6"	4.77
6'-0"	1.34	11'-0"	2.98	17'-0"	5.10
6'-6"	1.47	11'-6"	3.28	17'-6"	5.24
7'-0"	1.60	12'-0"	3.42	18'-6"	5.54
7'-6"	1.73	12'-6"	3.74	19'-0"	5.68

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<p>NOTES TO DESIGNER</p> <p>BOX CULVERTS AND WINGS</p> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE	SHEET 1 OF 1
		07/11	1000.05

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ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1

REVISION DATE

07.11

VIRGINIA DEPARTMENT OF TRANSPORTATION

GENERAL NOTES:

Capacity: AASHTO HL-93 Loading

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2007.

Design: AASHTO LRFD Bridge Design Specifications, 4th Edition 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current VDOT Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** Bars BH1 and BH3 shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The number of BL1 and BL2 bars shown in the table is the number of longitudinal bars shown in the typical section and may not equal the total number of bars required. BL1 and BL2 bars shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include the quantity for laps of BL1 and BL2 bars. The additional weight per longitudinal lap is shown in the table.

The minimum cover of main reinforcing bars shall be 2 1/2" from the face of the concrete for culverts under 0 to 2 foot fills and shall be 2" from the face of the concrete for all other culverts.

All reinforcing steel for culverts under 0 to 2 foot fills shall be low carbon/chromium reinforcing steel conforming to ASTM A1035.

At the Contractor's option, BV1 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

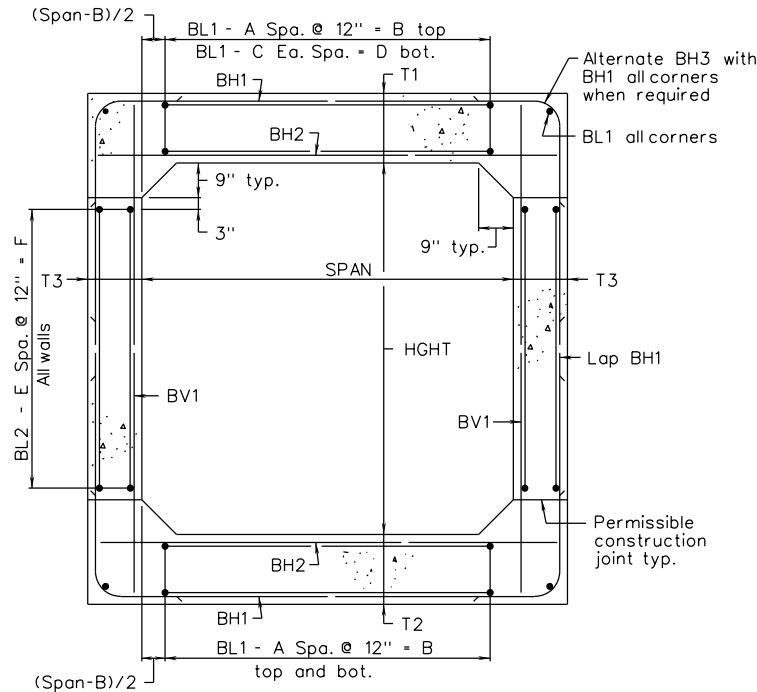
The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of the appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to standard BCE-01.

For modification of details for skewed culverts, see the skewed box details included in the road plans.

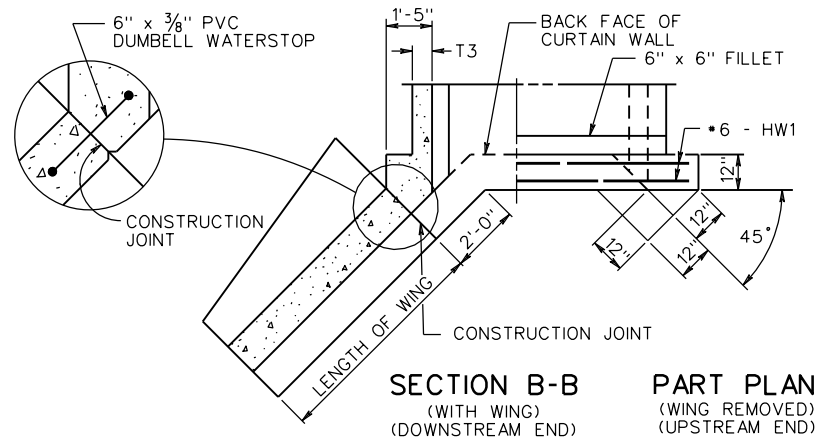
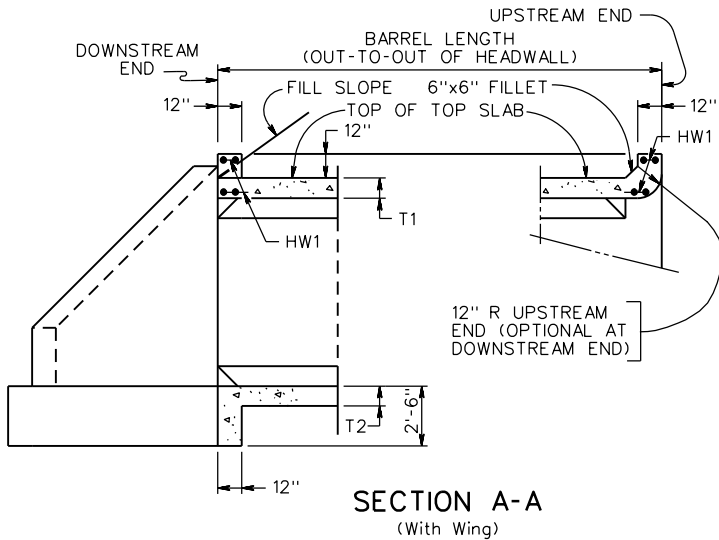
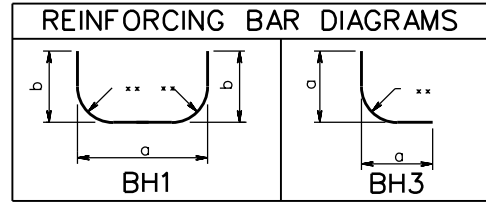
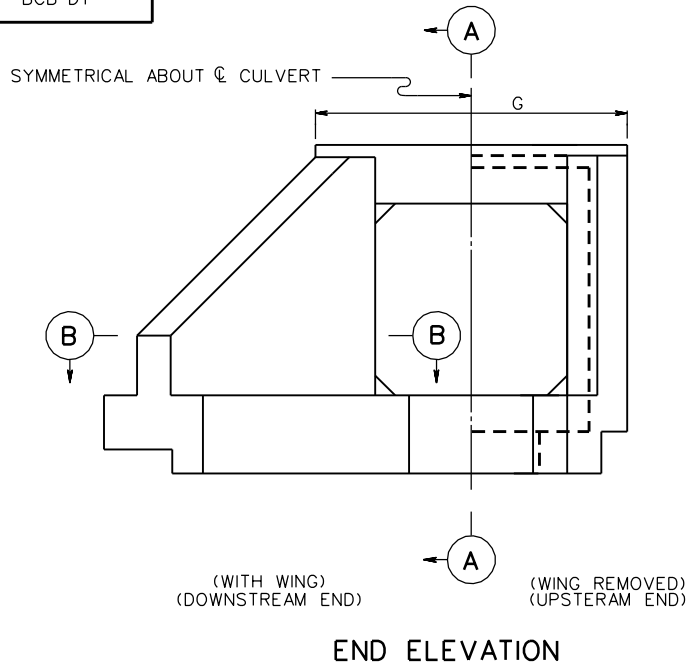
This standard shall be used with the BCB standard series.



TYPICAL SECTION

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<p>OVERSIZE BOX CULVERTS</p> <p>STANDARD DETAILS</p> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p>VDOT</p> <p>ROAD AND BRIDGE STANDARDS</p>	
		REVISION DATE	SHEET 1 OF 2
		07/11	1001.01



ROAD AND BRIDGE STANDARDS

SHEET 2 OF 2

REVISION DATE

1001.02

07/11

OVERSIZED BOX CULVERT STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

BCB-02

DIMENSIONS						REINFORCING STEEL																								
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)	A	B	C	D	E	F	BH1				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS				
											SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH		
12	14	10 3/4"	10 3/4"	8"	11	11'-0"	22	11'-0"	12	12'-0"	5	7"	13'-0"	8'-4 3/4"	29'-2"	8	7"	13'-0"	4	7"	4'-6 1/2"	8'-10"	5	8 1/2"	15'-5"	63	52			
12	16	11 3/4"	11 3/4"	8 1/4"	11	11'-0"	22	11'-0"	14	14'-0"	6	6"	13'-1/2"	9'-9 1/4"	31'-10"	8	6"	13'-0"	--	---	-----	-----	5	5 1/2"	17'-8"	63	60			
14	8	10 3/4"	10 3/4"	8"	13	13'-0"	26	13'-0"	6	6'-0"	5	7"	15'-0"	5'-4 3/4"	25'-2"	7	7"	15'-0"	4	7"	4'-3 5/8"	8'-4"	4	12"	9'-5"	73	28			
14	10	11"	11"	8"	13	13'-0"	26	13'-0"	8	8'-0"	5	8 1/2"	15'-0"	6'-5"	27'-2"	8	8 1/2"	15'-0"	4	8 1/2"	4'-3 5/8"	8'-4"	4	12"	11'-6"	73	36			
14	12	11"	11"	8"	13	13'-0"	26	13'-0"	10	10'-0"	5	7 1/2"	15'-0"	7'-5"	29'-2"	8	7 1/2"	15'-0"	4	7 1/2"	4'-3 5/8"	8'-4"	5	12"	13'-6"	73	44			
14	14	11 1/2"	11 1/2"	8"	13	13'-0"	26	13'-0"	12	12'-0"	6	6 1/2"	15'-0"	8'-9"	31'-9"	8	6 1/2"	15'-0"	--	---	-----	-----	5	8"	15'-7"	73	52			
14	16	12 1/2"	12 1/2"	8 1/4"	13	13'-0"	26	13'-0"	14	14'-0"	6	5 1/2"	15'-1/2"	9'-10"	34'-0"	8	5 1/2"	15'-0"	--	---	-----	-----	6	9"	17'-9"	73	60			

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS							
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G HEADWALL LENGTH	HW1 SIZE	LENGTH	INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
12	14	70.961	1.591	376.903	14'-10"	6	14'-6"	2.927	87.116	2.961	87.116	X
12	16	73.785	1.793	479.298	14'-10"	6	14'-6"	3.064	87.116	3.097	87.116	BB
14	8	70.839	1.431	305.160	16'-10"	6	16'-6"	2.557	99.132	2.597	99.132	L
14	10	73.663	1.554	302.186	16'-10"	6	16'-6"	2.735	99.132	2.775	99.132	P
14	12	76.487	1.649	360.576	16'-10"	6	16'-6"	2.920	99.132	2.961	99.132	T
14	14	79.311	1.790	445.148	16'-10"	6	16'-6"	3.092	99.132	3.132	99.132	X
14	16	82.135	2.004	543.465	16'-10"	6	16'-6"	3.222	99.132	3.262	99.132	BB

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION
REFERENCE

OVERSIZE BOX CULVERTS 0 TO 2 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 1

07/11


1001.03

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

DIMENSIONS						REINFORCING STEEL																					
SPAN	HGHT	T1	T2	T3	A	B	C	D	E	F	BH1				BH2			BH3			BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS		
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)							SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	LENGTH	SIZE			SPACING c-c	LENGTH
12	14	11"	11"	8"	11	11'-0"	11	11'-0"	12	12'-0"	5	7"	13'-0"	8'-5"	29'-2"	8	7"	13'-0"	4	7"	4'-6 1/2"	8'-10"	6	8 1/2"	15'-6"	52	52
12	16	12 1/4"	12 1/4"	8 1/2"	11	11'-0"	11	11'-0"	14	14'-0"	6	6 1/2"	13'-1"	9'-10"	31'-11"	8	6 1/2"	13'-0"	4	6 1/2"	5'-1"	9'-11"	6	6"	17'-9"	52	60
14	8	10 1/4"	10 1/4"	8"	13	13'-0"	13	13'-0"	6	6'-0"	5	6"	15'-0"	5'-4 1/4"	25'-1"	7	6"	15'-0"	--	--	--	--	4	7 1/2"	9'-5"	60	28
14	10	10 1/4"	10 1/4"	8"	13	13'-0"	13	13'-0"	8	8'-0"	6	7"	15'-0"	6'-4 1/4"	26'-11"	8	7"	15'-0"	--	--	--	--	4	7 1/2"	11'-5"	60	36
14	12	10 1/2"	10 1/2"	8"	13	13'-0"	13	13'-0"	10	10'-0"	5	5 1/2"	15'-0"	7'-4 1/2"	29'-1"	7	5 1/2"	15'-0"	--	--	--	--	5	10"	13'-5"	60	44
14	14	11 1/2"	11 1/2"	8 1/2"	13	13'-0"	13	13'-0"	12	12'-0"	5	6 1/2"	15'-1"	8'-5 1/2"	31'-3"	8	6 1/2"	15'-0"	3	6 1/2"	4'-7"	8'-11"	6	10"	15'-7"	60	52
14	16	12 1/2"	12 1/2"	8 3/4"	13	13'-0"	13	13'-0"	14	14'-0"	6	6"	15'-1"	9'-10"	34'-0"	8	6"	15'-1"	--	--	--	--	6	6"	17'-9"	60	60

SPAN	HGHT	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS																	
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G	HW1		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL										
(FT.)	(FT.)				HEADWALL LENGTH	SIZE	LENGTH															
12	14	61.776	1.610	386.454	14'-10"	6	14'-6"	2.922	87.116	2.956	87.116	X										
12	16	64.600	1.856	521.464	14'-10"	6	14'-6"	3.053	87.116	3.086	87.116	BB										
14	8	59.984	1.384	298.025	16'-10"	6	16'-6"	2.570	99.132	2.611	99.132	L										
14	10	62.808	1.479	353.948	16'-10"	6	16'-6"	2.756	99.132	2.796	99.132	P										
14	12	65.632	1.602	360.712	16'-10"	6	16'-6"	2.934	99.132	2.975	99.132	T										
14	14	68.456	1.839	412.213	16'-10"	6	16'-6"	3.092	99.132	3.132	99.132	X										
14	16	71.280	2.058	537.499	16'-10"	6	16'-6"	3.194	99.132	3.234	99.132	BB										

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 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 1	REVISION DATE
1001.04	07/11

OVERSIZE BOX CULVERTS
2 TO 5 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

BCB-10

DIMENSIONS						REINFORCING STEEL																					
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)		BH1				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS						
					A	B	C	D	E	F	SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE			SPACING c-c	a	LENGTH	SIZE	SPACING c-c	LENGTH
12	14	11 1/2"	11 1/2"	9"	11	11'-0"	11	11'-0"	12	12'-0"	5	6 1/2"	13'-2"	8'-5 1/2"	29'-5"	8	6 1/2"	13'-2"	4	6 1/2"	4'-7"	8'-11"	6	7 1/2"	15'-7"	52	52
12	16	12"	12"	10 1/2"	11	11'-0"	11	11'-0"	14	14'-0"	6	6"	13'-5"	9'-9 1/2"	32'-4"	8	6"	13'-5"	--	---	-----	-----	6	6"	17'-8"	52	60
14	8	11 3/4"	11 3/4"	8"	13	13'-0"	13	13'-0"	6	6'-0"	6	6 1/2"	15'-0"	5'-9 1/2"	25'-10"	8	6 1/2"	15'-0"	--	---	-----	-----	4	6"	9'-8"	60	28
14	10	11 3/4"	11 3/4"	8"	13	13'-0"	13	13'-0"	8	8'-0"	5	6"	15'-0"	6'-5 3/4"	27'-4"	8	6"	15'-0"	3	6"	4'-3 5/8"	8'-5"	4	6"	11'-8"	60	36
14	12	12"	12"	8"	13	13'-0"	13	13'-0"	10	10'-0"	5	6"	15'-0"	7'-6"	29'-4"	8	6"	15'-0"	3	6"	4'-3 5/8"	8'-5"	6	12"	13'-8"	60	44
14	14	12 1/2"	12 1/2"	9 1/2"	13	13'-0"	13	13'-0"	12	12'-0"	5	5 1/2"	15'-3"	8'-6 1/2"	31'-8"	8	5 1/2"	15'-3"	3	5 1/2"	4'-8"	9'-1"	7	12"	15'-9"	60	52
14	16	12 3/4"	12 3/4"	10 1/2"	13	13'-0"	13	13'-0"	14	14'-0"	6	5 1/2"	15'-5"	9'-10"	34'-3"	8	5 1/2"	15'-5"	--	---	-----	-----	6	7"	17'-9"	60	60

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS							
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G HEADWALL LENGTH	HW1 SIZE	LENGTH	INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
12	14	61.776	1.746	421.454	14'-10"	6	14'-6"	2.911	87.116	2.945	87.116	X
12	16	64.600	2.059	503.510	14'-10"	6	14'-6"	3.003	87.116	3.036	87.116	BB
14	8	59.984	1.521	363.885	16'-10"	6	16'-6"	2.529	99.132	2.569	99.132	L
14	10	62.808	1.619	384.341	16'-10"	6	16'-6"	2.714	99.132	2.754	99.132	P
14	12	65.632	1.741	410.358	16'-10"	6	16'-6"	2.893	99.132	2.933	99.132	T
14	14	68.456	2.029	478.737	16'-10"	6	16'-6"	3.064	99.132	3.105	99.132	X
14	16	71.280	2.276	561.097	16'-10"	6	16'-6"	3.187	99.132	3.227	99.132	BB

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SPECIFICATION REFERENCE

OVERSIZE BOX CULVERTS
5 TO 10 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 1
07/11	1001.05

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

DIMENSIONS						REINFORCING STEEL																					
SPAN	HGHT	T1	T2	T3		BH1				BH2			BH3			BVI			NO. #4 BARS	NO. #3 BARS							
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH			SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	LENGTH
12	14	15"	15"	11 1/2"	11	11'-0"	11	11'-0"	12	12'-0"	6	6"	13'-7"	9'-2"	31'-0"	8	6"	13'-6"	--	---	-----	-----	7	9"	16'-2"	52	52
12	16	15 1/4"	15 1/4"	13"	11	11'-0"	11	11'-0"	14	14'-0"	6	5 1/2"	13'-10"	10'-2"	33'-3"	8	5 1/2"	13'-9"	3	5 1/2"	5'-4"	10'-5"	8	11"	18'-2"	52	60
14	8	16 3/4"	16 3/4"	8"	13	13'-0"	13	13'-0"	6	6'-0"	4	5 1/2"	15'-0"	5'-11"	26'-4"	8	5 1/2"	15'-0"	4	5 1/2"	4'-4"	8'-5"	4	11"	10'-5"	60	28
14	10	16 3/4"	16 3/4"	8"	13	13'-0"	13	13'-0"	8	8'-0"	5	5"	15'-0"	7'-1"	28'-6"	8	5"	15'-0"	--	---	-----	-----	5	5"	12'-5"	60	36
14	12	16 3/4"	16 3/4"	9 1/2"	13	13'-0"	13	13'-0"	10	10'-0"	5	5"	15'-3"	8'-1"	30'-9"	8	5"	15'-3"	--	---	-----	-----	6	10"	14'-5"	60	44
14	14	16 3/4"	16 3/4"	11"	13	13'-0"	13	13'-0"	12	12'-0"	5	5"	15'-6"	9'-1"	33'-0"	8	5"	15'-6"	4	5"	5'-1"	9'-10"	7	10"	16'-5"	60	52
14	16	17"	17"	13 1/2"	13	13'-0"	13	13'-0"	14	14'-0"	6	5"	15'-11"	10'-4"	35'-8"	8	5"	15'-11"	--	---	-----	-----	7	9"	18'-6"	60	60

SPAN	HGHT	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS																			
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G	HW1		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL												
(FT.)	(FT.)				HEADWALL LENGTH	SIZE	LENGTH																	
12	14	61.776	2.287	480.799	14'-10"	6	14'-6"	2.810	87.116	2.844	87.116	X												
12	16	64.600	2.614	583.945	14'-10"	6	14'-6"	2.835	87.116	2.868	87.116	CC												
14	8	59.984	1.993	374.438	16'-10"	6	16'-6"	2.408	99.132	2.449	99.132	M												
14	10	62.808	2.086	459.403	16'-10"	6	16'-6"	2.594	99.132	2.634	99.132	Q												
14	12	65.632	2.321	466.628	16'-10"	6	16'-6"	2.779	99.132	2.820	99.132	U												
14	14	68.456	2.585	575.524	16'-10"	6	16'-6"	2.913	99.132	2.953	99.132	Y												
14	16	71.280	3.032	632.963	16'-10"	6	16'-6"	2.970	99.132	3.009	99.132	CC												

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ROAD AND BRIDGE STANDARDS

OVERSIZE BOX CULVERTS

10 TO 20 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

SHEET 1 OF 1

REVISION DATE

1001.06

07/11

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

BCB-30

DIMENSIONS						REINFORCING STEEL																								
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)	A	B	C	D	E	F	BH1				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS				
											SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH		
12	14	19 1/2"	19 1/2"	12 1/2"	11	11'-0"	11	11'-0"	12	12'-0"	5	5 1/2"	13'-9"	9'-4"	31'-9"	8	5 1/2"	13'-9"	4	5 1/2"	5'-4"	10'-4"	7	8"	16'-11"	52	52			
12	16	19 1/2"	19 1/2"	15"	11	11'-0"	11	11'-0"	14	14'-0"	6	5 1/2"	14'-2"	10'-6"	34'-4"	8	5 1/2"	14'-1"	3	5 1/2"	5'-8"	11'-2"	8	10"	18'-11"	52	60			
14	8	22 1/2"	22 1/2"	8"	13	13'-0"	13	13'-0"	6	6'-0"	4	5"	15'-0"	6'-5"	27'-3"	8	5"	15'-0"	--	---	-----	-----	5	12"	11'-4"	60	28			
14	10	22 3/4"	22 3/4"	8"	13	13'-0"	13	13'-0"	8	8'-0"	4	5"	15'-0"	7'-5"	29'-4"	8	5"	15'-0"	3	5"	4'-9"	9'-4"	5	6 1/2"	13'-5"	60	36			
14	12	22 3/4"	22 3/4"	10 1/2"	13	13'-0"	13	13'-0"	10	10'-0"	5	4 1/2"	15'-5"	8'-7"	31'-11"	8	4 1/2"	15'-4"	--	---	-----	-----	6	9"	15'-5"	60	44			
14	14	22 3/4"	22 3/4"	12 1/2"	13	13'-0"	13	13'-0"	12	12'-0"	5	5"	15'-9"	9'-7"	34'-3"	8	5"	15'-8"	3	5"	5'-7"	10'-11"	5	5"	17'-5"	60	52			
14	16	22 3/4"	22 3/4"	15"	13	13'-0"	13	13'-0"	14	14'-0"	6	4 1/2"	16'-2"	10'-9"	36'-10"	8	4 1/2"	16'-2"	--	---	-----	-----	7	9"	19'-5"	60	60			

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G HEADWALL LENGTH	HW1 SIZE LENGTH		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL	
12	14	61.776	2.776	529.473	14'-10"	6	14'-6"	2.572	87.116	2.604	87.116	Y	
12	16	64.600	3.221	612.127	14'-10"	6	14'-6"	2.588	87.116	2.620	87.116	CC	
14	8	59.984	2.538	362.624	16'-10"	6	16'-6"	2.267	99.132	2.308	99.132	N	
14	10	62.808	2.655	433.615	16'-10"	6	16'-6"	2.446	99.132	2.486	99.132	R	
14	12	65.632	2.991	524.087	16'-10"	6	16'-6"	2.607	99.132	2.647	99.132	V	
14	14	68.456	3.337	568.048	16'-10"	6	16'-6"	2.653	99.132	2.692	99.132	Z	
14	16	71.280	3.786	702.626	16'-10"	6	16'-6"	2.638	99.132	2.676	99.132	DD	

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SPECIFICATION
REFERENCE

OVERSIZE BOX CULVERTS

20 TO 30 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 1

07/11

1001.07

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

DIMENSIONS						REINFORCING STEEL																					
SPAN	HGHT	T1	T2	T3		BH1				BH2			BH3				BVI			NO. BL1 #4 BARS	NO. BL2 #3 BARS						
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE			SPACING C-C	a	LENGTH	SIZE	SPACING C-C	LENGTH
12	14	22 ³ / ₄ "	22 ³ / ₄ "	14"	11	11'-0"	11	11'-0"	12	12'-0"	5	5"	14'-0"	9'-7"	32'-6"	8	5"	14'-0"	4	5"	5'-7"	10'-10"	8	10"	17'-5"	52	52
12	16	22 ³ / ₄ "	22 ³ / ₄ "	17"	11	11'-0"	11	11'-0"	14	14'-0"	6	5"	14'-6"	10'-9"	35'-2"	8	5"	14'-6"	3	5"	6'-0"	11'-8"	6	5"	19'-5"	52	60
14	8	27 ³ / ₄ "	27 ³ / ₄ "	9"	13	13'-0"	13	13'-0"	6	6'-0"	4	4 ¹ / ₂ "	15'-2"	6'-10"	28'-4"	8	4 ¹ / ₂ "	15'-1"	--	---	-----	-----	5	9"	12'-3"	60	28
14	10	27 ³ / ₄ "	27 ³ / ₄ "	8 ¹ / ₂ "	13	13'-0"	13	13'-0"	8	8'-0"	4	4 ¹ / ₂ "	15'-1"	7'-10"	30'-3"	8	4 ¹ / ₂ "	15'-0"	--	---	-----	-----	7	9"	14'-3"	60	36
14	12	27 ³ / ₄ "	27 ³ / ₄ "	11 ¹ / ₂ "	13	13'-0"	13	13'-0"	10	10'-0"	5	4 ¹ / ₂ "	15'-7"	9'-0"	32'-11"	8	4 ¹ / ₂ "	15'-6"	--	---	-----	-----	5	4 ¹ / ₂ "	16'-3"	60	44
14	14	27 ³ / ₄ "	27 ³ / ₄ "	14"	13	13'-0"	13	13'-0"	12	12'-0"	6	4 ¹ / ₂ "	16'-0"	10'-2"	35'-6"	8	4 ¹ / ₂ "	16'-0"	--	---	-----	-----	5	4 ¹ / ₂ "	18'-3"	60	52
14	16	27 ³ / ₄ "	27 ³ / ₄ "	16 ¹ / ₂ "	13	13'-0"	13	13'-0"	14	14'-0"	5	4 ¹ / ₂ "	16'-5"	11'-0"	37'-9"	8	4 ¹ / ₂ "	16'-5"	4	4 ¹ / ₂ "	6'-5"	12'-6"	8	9"	20'-3"	60	60

SPAN	HGHT	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF			HEADWALLS											
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)		G	HW1		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL				
(FT.)	(FT.)				HEADWALL LENGTH	SIZE	LENGTH										
12	14	61.776	3.219	584.665	14'-10"	6	14'-6"	2.351	87.116	2.382	87.116	Z					
12	16	64.600	3.751	686.358	14'-10"	6	14'-6"	2.314	87.116	2.344	87.116	DD					
14	8	59.984	3.110	410.138	16'-10"	6	16'-6"	2.063	99.132	2.103	99.132	O					
14	10	62.808	3.172	462.500	16'-10"	6	16'-6"	2.281	99.132	2.321	99.132	S					
14	12	65.632	3.577	560.733	16'-10"	6	16'-6"	2.315	99.132	2.354	99.132	W					
14	14	68.456	3.997	682.253	16'-10"	6	16'-6"	2.333	99.132	2.371	99.132	AA					
14	16	71.280	4.483	747.896	16'-10"	6	16'-6"	2.281	99.132	2.318	99.132	EE					

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ROAD AND BRIDGE STANDARDS

OVERSIZE BOX CULVERTS

30 TO 40 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

SHEET 1 OF 1

REVISION DATE

1001.08

07/11

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCB-DT.

BCB-50

DIMENSIONS						REINFORCING STEEL																					
SPAN	HGHT	T1	T2	T3		BH1				BH2			BH3				BVI			NO. BL1 #4 BARS	NO. BL2 #3 BARS						
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE			SPACING C-C	a	LENGTH	SIZE	SPACING C-C	LENGTH
12	14	27 1/2"	27 1/2"	15 1/2"	11	11'-0"	11	11'-0"	12	12'-0"	5	5"	14'-3"	10'-0"	33'-7"	8	5"	14'-3"	4	5"	6'-0"	11'-8"	8	10"	18'-3"	52	52
12	16	27 3/4"	27 3/4"	18 1/2"	11	11'-0"	11	11'-0"	14	14'-0"	6	4 1/2"	14'-9"	11'-2"	36'-3"	9	4 1/2"	14'-9"	3	4 1/2"	6'-5"	12'-6"	8	9"	20'-3"	52	60
14	8	31 1/2"	31 1/2"	11 3/4"	13	13'-0"	13	13'-0"	6	6'-0"	4	4 1/2"	15'-7 1/2"	7'-2"	29'-5"	9	4 1/2"	15'-7"	--	---	-----	-----	4	9"	12'-11"	60	28
14	10	31 1/2"	31 1/2"	10 3/4"	13	13'-0"	13	13'-0"	8	8'-0"	4	4 1/2"	15'-5 1/2"	8'-2"	31'-3"	9	4 1/2"	15'-5"	--	---	-----	-----	5	4 1/2"	14'-11"	60	36
14	12	31 1/4"	31 1/4"	11 1/2"	13	13'-0"	13	13'-0"	10	10'-0"	4	4 1/2"	15'-7"	9'-2"	33'-4"	9	4 1/2"	15'-6"	4	4 1/2"	5'-11"	11'-5"	7	8"	16'-10"	60	44
14	14	31 1/4"	31 1/4"	15"	13	13'-0"	13	13'-0"	12	12'-0"	5	4 1/2"	16'-2"	10'-4"	36'-1"	9	4 1/2"	16'-2"	3	4 1/2"	6'-3"	12'-4"	7	7"	18'-10"	60	52
14	16	31 1/4"	31 1/4"	17 1/2"	13	13'-0"	13	13'-0"	14	14'-0"	6	4 1/2"	16'-7"	11'-6"	38'-8"	9	4 1/2"	16'-7"	4	4 1/2"	6'-8"	13'-1"	6	4 1/2"	20'-10"	60	60

SPAN	HGHT	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS																				
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G	HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL													
(FT.)	(FT.)				HEADWALL LENGTH	SIZE	LENGTH																		
12	14	61.776	3.810	603.234	14'-10"	6	14'-6"	2.080	87.116	2.110	87.116	AA													
12	16	64.600	4.390	817.047	14'-10"	6	14'-6"	1.979	87.116	2.008	87.116	EE													
14	8	59.984	3.689	470.179	16'-10"	6	16'-6"	1.732	99.132	1.770	99.132	O													
14	10	62.808	3.735	536.664	16'-10"	6	16'-6"	1.965	99.132	2.003	99.132	S													
14	12	65.632	3.914	651.161	16'-10"	6	16'-6"	2.071	99.132	2.109	99.132	W													
14	14	68.456	4.464	743.491	16'-10"	6	16'-6"	2.010	99.132	2.047	99.132	AA													
14	16	71.280	4.961	941.671	16'-10"	6	16'-6"	1.939	99.132	1.974	99.132	EE													

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SPECIFICATION REFERENCE

OVERSIZE BOX CULVERTS

40 TO 50 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 1 OF 1

07/11

1001.09

GENERAL NOTES:

Capacity: AASHTO HL-93 Loading

Specifications:

Construction: Virginia Department of Transportation Road and Bridge Specifications, 2007.

Design: AASHTO LRFD Bridge Design Specifications, 4th Edition 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current VDOT Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** Bars BH1 and BH3 shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The number of BL1 and BL2 bars shown in the table is the number of longitudinal bars shown in the typical section and may not equal the total number of bars required. BL1 and BL2 bars shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include the quantity for laps of BL1 and BL2 bars. The additional weight per longitudinal lap is shown in the table.

The minimum cover of main reinforcing bars shall be 2 1/2" from the face of the concrete for culverts under 0 to 2 foot fills and shall be 2" from the face of the concrete for all other culverts.

All reinforcing steel for culverts under 0 to 2 foot fills shall be low carbon/chromium reinforcing steel conforming to ASTM A1035.

At the Contractor's option, BV1 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

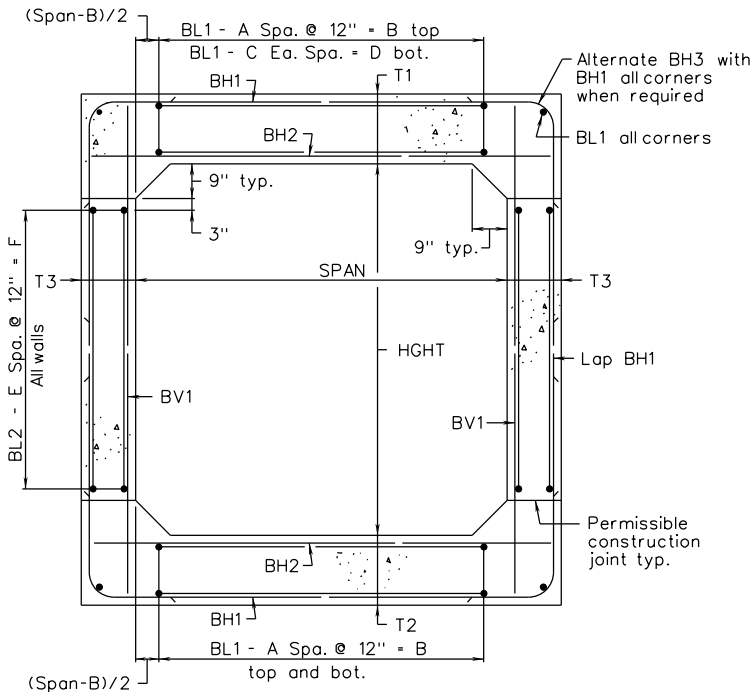
The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of the appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to standard BCE-01.

For modification of details for skewed culverts, see the skewed box details included in the road plans.

This standard shall be used with the BCS standard series.



TYPICAL SECTION

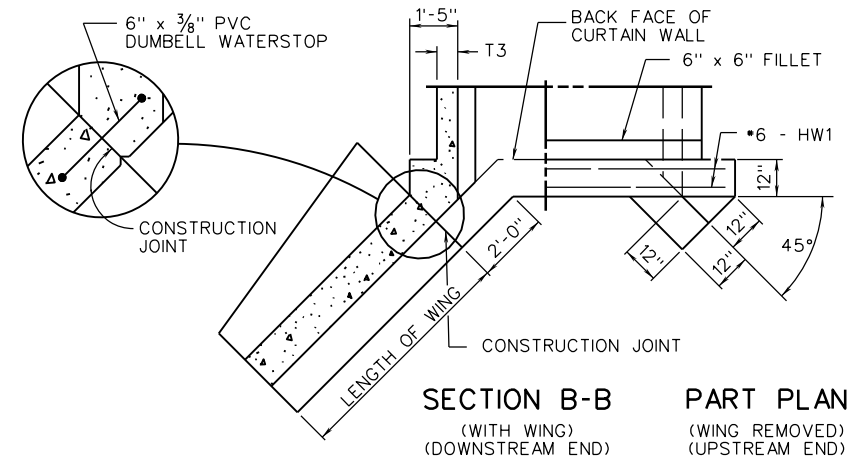
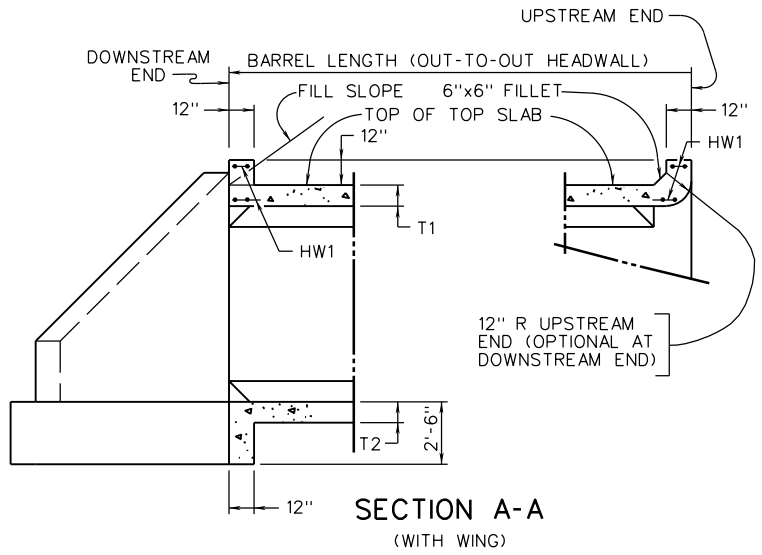
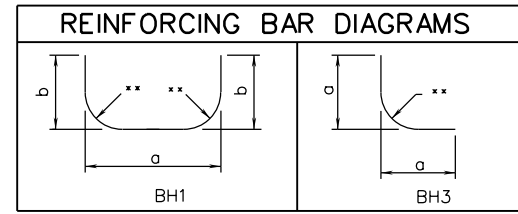
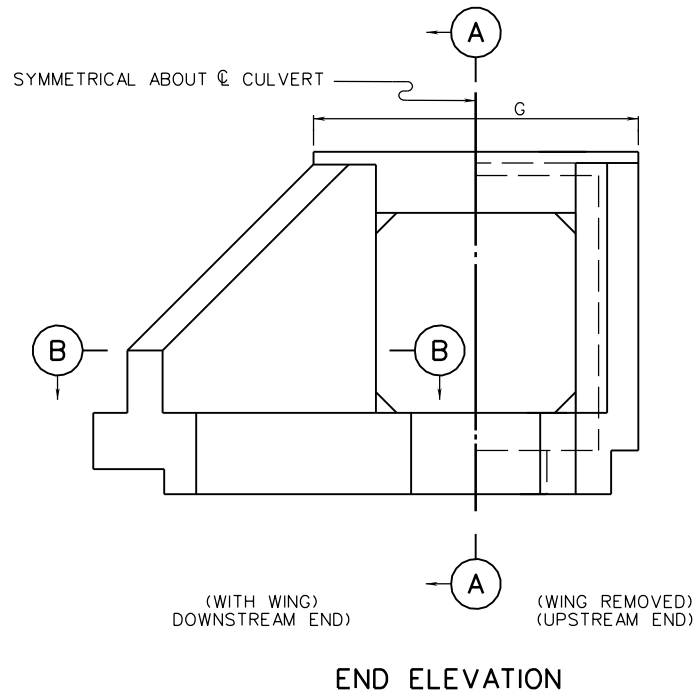
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VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.01	07/11

**SINGLE BOX CULVERTS
STANDARD DETAILS**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE



SPECIFICATION REFERENCE


SINGLE BOX CULVERTS
STANDARD DETAILS
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE 07/11	SHEET 2 OF 2 1002.02

FOR TYPICAL SECTION. NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

DIMENSIONS					REINFORCING STEEL																						
SPAN	HGHT	T1	T2	T3	A	B	C	D	E	F	BH1			BH2			BH3			BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS			
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)							SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH			SIZE	SPACING C-C	LENGTH
3	3	8 1/2"	8 1/2"	8"	2	2'-0"	4	2'-0"	1	1'-0"	4	12"	4'-0"	2'-8 1/2"	8'-11"	5	12"	4'-0"	4	12"	2'-6"	4'-9"	4	12"	4'-1"	18	8
3	4	8 1/2"	8 1/2"	8"	2	2'-0"	4	2'-0"	2	2'-0"	4	12"	4'-0"	3'-2 1/2"	9'-11"	6	12"	4'-0"	--	--	--	--	4	12"	5'-1"	18	12
4	3	9"	9"	8"	3	3'-0"	6	3'-0"	1	1'-0"	4	12"	5'-0"	2'-9"	10'-0"	6	12"	5'-0"	--	--	--	--	4	10 1/2"	4'-2"	23	8
4	4	9"	9"	8"	3	3'-0"	6	3'-0"	2	2'-0"	4	12"	5'-0"	3'-3"	11'-0"	6	12"	5'-0"	--	--	--	--	4	12"	5'-2"	23	12
4	5	9"	9"	8"	3	3'-0"	6	3'-0"	3	3'-0"	4	12"	5'-0"	3'-9"	12'-0"	6	12"	5'-0"	--	--	--	--	4	12"	6'-2"	23	16
4	6	9"	9"	8"	3	3'-0"	6	3'-0"	4	4'-0"	4	11"	5'-0"	4'-3"	13'-0"	6	11"	5'-0"	--	--	--	--	4	12"	7'-2"	23	20
5	3	9 1/4"	9 1/4"	8"	4	4'-0"	8	4'-0"	1	1'-0"	4	11"	6'-0"	2'-9 1/4"	11'-0"	6	11"	6'-0"	--	--	--	--	4	12"	4'-2"	28	8
5	4	9 1/4"	9 1/4"	8"	4	4'-0"	8	4'-0"	2	2'-0"	4	11"	6'-0"	3'-3 1/4"	12'-0"	6	11"	6'-0"	--	--	--	--	4	12"	5'-2"	28	12
5	5	9 1/4"	9 1/4"	8"	4	4'-0"	8	4'-0"	3	3'-0"	4	10"	6'-0"	3'-9 1/4"	13'-0"	6	10"	6'-0"	--	--	--	--	4	12"	6'-2"	28	16
5	6	9"	9"	8"	4	4'-0"	8	4'-0"	4	4'-0"	4	10"	6'-0"	4'-3"	14'-0"	6	10"	6'-0"	--	--	--	--	4	12"	7'-2"	28	20
5	7	9"	9"	8"	4	4'-0"	8	4'-0"	5	5'-0"	4	9"	6'-0"	4'-9"	15'-0"	6	9"	6'-0"	--	--	--	--	4	12"	8'-2"	28	24
6	4	9 1/4"	9 1/4"	8"	5	5'-0"	10	5'-0"	2	2'-0"	4	9"	7'-0"	3'-3 1/4"	13'-0"	6	9"	7'-0"	--	--	--	--	4	12"	5'-2"	33	12
6	5	9 1/4"	9 1/4"	8"	5	5'-0"	10	5'-0"	3	3'-0"	4	9"	7'-0"	3'-9 1/4"	14'-0"	6	9"	7'-0"	--	--	--	--	4	12"	6'-2"	33	16
6	6	9 1/4"	9 1/4"	8"	5	5'-0"	10	5'-0"	4	4'-0"	4	9"	7'-0"	4'-3 1/4"	15'-0"	6	9"	7'-0"	--	--	--	--	4	12"	7'-2"	33	20
6	7	9 1/4"	9 1/4"	8"	5	5'-0"	10	5'-0"	5	5'-0"	4	8"	7'-0"	4'-9 1/4"	16'-0"	6	8"	7'-0"	--	--	--	--	4	12"	8'-2"	33	24
6	8	9 1/4"	9 1/4"	8"	5	5'-0"	10	5'-0"	6	6'-0"	4	12"	7'-0"	5'-3 1/4"	17'-0"	8	12"	7'-0"	4	12"	3'-3"	6'-4"	4	12"	9'-2"	33	28
7	4	9 1/2"	9 1/2"	8"	6	6'-0"	12	6'-0"	2	2'-0"	4	9"	8'-0"	3'-3 1/2"	14'-1"	6	9"	8'-0"	--	--	--	--	4	12"	5'-3"	38	12
7	6	9 1/2"	9 1/2"	8"	6	6'-0"	12	6'-0"	4	4'-0"	4	8"	8'-0"	4'-3 1/2"	16'-1"	6	8"	8'-0"	--	--	--	--	4	12"	7'-3"	38	20
7	8	9 1/2"	9 1/2"	8"	6	6'-0"	12	6'-0"	6	6'-0"	4	7"	8'-0"	5'-3 1/2"	18'-1"	6	7"	8'-0"	--	--	--	--	4	12"	9'-3"	38	28
7	10	9 1/2"	9 1/2"	8"	6	6'-0"	12	6'-0"	8	8'-0"	4	6"	8'-0"	6'-3 1/2"	20'-1"	6	6"	8'-0"	--	--	--	--	4	12"	11'-3"	38	36
8	4	9 3/4"	9 3/4"	8"	7	7'-0"	14	7'-0"	2	2'-0"	4	8"	9'-0"	3'-3 3/4"	15'-1"	6	8"	9'-0"	--	--	--	--	4	12"	5'-3"	43	12
8	6	9 3/4"	9 3/4"	8"	7	7'-0"	14	7'-0"	4	4'-0"	5	12"	9'-0"	4'-3 3/4"	17'-0"	8	12"	9'-0"	3	12"	3'-6"	6'-10"	4	12"	7'-3"	43	20
8	8	9 3/4"	9 3/4"	8"	7	7'-0"	14	7'-0"	6	6'-0"	5	7"	9'-0"	5'-3 3/4"	19'-0"	6	7"	9'-0"	--	--	--	--	5	12"	9'-3"	43	28
8	10	9 1/2"	9 1/2"	8"	7	7'-0"	14	7'-0"	8	8'-0"	4	9"	9'-0"	6'-3 1/2"	21'-1"	6	9"	9'-0"	4	9"	3'-7"	6'-11"	4	12"	11'-3"	43	36
9	4	9 3/4"	9 3/4"	8"	8	8'-0"	16	8'-0"	2	2'-0"	6	12"	10'-0"	3'-7 1/4"	16'-4"	8	12"	10'-0"	5	12"	3'-11"	7'-5"	4	12"	5'-3"	48	12
9	6	9 3/4"	9 3/4"	8"	8	8'-0"	16	8'-0"	4	4'-0"	5	7"	10'-0"	4'-3 3/4"	18'-0"	6	7"	10'-0"	--	--	--	--	4	12"	7'-3"	48	20
9	8	9 3/4"	9 3/4"	8"	8	8'-0"	16	8'-0"	6	6'-0"	4	6"	10'-0"	5'-3 3/4"	20'-1"	6	6"	10'-0"	--	--	--	--	4	12"	9'-3"	48	28
9	10	9 3/4"	9 3/4"	8"	8	8'-0"	16	8'-0"	8	8'-0"	5	10 1/2"	10'-0"	6'-3 3/4"	22'-0"	8	10 1/2"	10'-0"	3	10 1/2"	3'-8"	7'-3"	4	12"	11'-3"	48	36
9	12	9 3/4"	9 3/4"	8"	8	8'-0"	16	8'-0"	10	10'-0"	5	8"	10'-0"	7'-3 3/4"	24'-0"	8	8"	10'-0"	4	8"	4'-1"	7'-11"	5	11 1/2"	13'-3"	48	44
10	4	10"	10"	8"	9	9'-0"	18	9'-0"	2	2'-0"	4	7"	11'-0"	3'-6"	17'-6"	6	7"	11'-0"	4	7"	3'-10"	7'-5"	4	12"	5'-4"	53	12
10	6	10"	10"	8"	9	9'-0"	18	9'-0"	4	4'-0"	5	10"	11'-0"	4'-9"	19'-10"	7	10"	11'-0"	--	--	--	--	4	12"	7'-4"	53	20
10	8	10"	10"	8"	9	9'-0"	18	9'-0"	6	6'-0"	5	10"	11'-0"	5'-9"	21'-10"	8	10"	11'-0"	3	10"	3'-10"	7'-5"	4	12"	9'-4"	53	28
10	10	10"	10"	8"	9	9'-0"	18	9'-0"	8	8'-0"	4	8"	11'-0"	6'-6"	23'-6"	7	8"	11'-0"	4	8"	3'-10"	7'-5"	4	12"	11'-4"	53	36
10	12	10"	10"	8"	9	9'-0"	18	9'-0"	10	10'-0"	4	7"	11'-0"	7'-6"	25'-6"	8	7"	11'-0"	4	7"	4'-1"	7'-11"	5	12"	13'-4"	53	44
12	6	10 1/4"	10 1/4"	8"	11	11'-0"	22	11'-0"	4	4'-0"	6	9"	13'-0"	5'-0"	22'-3"	8	9"	13'-0"	4	9"	4'-3"	8'-5"	4	12"	7'-5"	63	20
12	8	10"	10"	8"	11	11'-0"	22	11'-0"	6	6'-0"	5	8"	13'-0"	5'-9"	23'-10"	8	8"	13'-0"	3	8"	4'-3"	8'-5"	4	12"	9'-4"	63	28
12	10	10"	10"	8"	11	11'-0"	22	11'-0"	8	8'-0"	5	7"	13'-0"	6'-9"	25'-10"	7	7"	13'-0"	--	--	--	--	4	12"	11'-4"	63	36
12	12	10 1/4"	10 1/4"	8"	11	11'-0"	22	11'-0"	10	10'-0"	5	8"	13'-0"	7'-9"	27'-11"	8	8"	13'-0"	4	8"	4'-3"	8'-5"	5	12"	13'-5"	63	44

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 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.03	07/11

SINGLE BOX CULVERTS
0 TO 2 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH						
3	3	17.854	0.413	54.850	5'-10"	6	5'- 6"	1.041	33.044	1.045	33.044	A	
3	4	19.266	0.463	48.592	5'-10"	6	5'- 6"	1.134	33.044	1.137	33.044	C	
4	3	22.029	0.482	53.114	6'-10"	6	6'- 6"	1.142	39.052	1.149	39.052	A	
4	4	23.441	0.531	56.495	6'-10"	6	6'- 6"	1.235	39.052	1.242	39.052	C	
4	5	24.853	0.580	60.671	6'-10"	6	6'- 6"	1.328	39.052	1.335	39.052	E	
4	6	26.265	0.629	67.791	6'-10"	6	6'- 6"	1.420	39.052	1.427	39.052	G	
5	3	26.204	0.547	62.973	7'-10"	6	7'- 6"	1.259	45.060	1.269	45.060	B	
5	4	27.616	0.596	67.271	7'-10"	6	7'- 6"	1.351	45.060	1.362	45.060	D	
5	5	29.028	0.645	75.429	7'-10"	6	7'- 6"	1.444	45.060	1.455	45.060	F	
5	6	30.440	0.684	79.872	7'-10"	6	7'- 6"	1.518	45.060	1.529	45.060	G	
5	7	31.852	0.732	89.391	7'-10"	6	7'- 6"	1.611	45.060	1.621	45.060	I	
6	4	31.791	0.652	84.653	8'-10"	6	8'- 6"	1.449	51.068	1.463	51.068	D	
6	5	33.203	0.701	89.275	8'-10"	6	8'- 6"	1.542	51.068	1.555	51.068	F	
6	6	34.615	0.750	93.896	8'-10"	6	8'- 6"	1.634	51.068	1.648	51.068	H	
6	7	36.027	0.798	105.585	8'-10"	6	8'- 6"	1.727	51.068	1.741	51.068	J	
6	8	37.439	0.846	124.695	8'-10"	6	8'- 6"	1.820	51.068	1.833	51.068	L	
7	4	35.966	0.721	94.040	9'-10"	6	9'- 6"	1.545	57.076	1.562	57.076	D	
7	6	38.790	0.818	110.869	9'-10"	6	9'- 6"	1.730	57.076	1.747	57.076	H	
7	8	41.614	0.916	130.884	9'-10"	6	9'- 6"	1.915	57.076	1.933	57.076	L	
7	10	44.438	1.012	155.677	9'-10"	6	9'- 6"	2.101	57.076	2.118	57.076	P	
8	4	40.141	0.793	111.031	10'-10"	6	10'- 6"	1.639	63.084	1.659	63.084	D	
8	6	42.965	0.889	142.409	10'-10"	6	10'- 6"	1.824	63.084	1.845	63.084	H	
8	8	45.789	0.985	175.199	10'-10"	6	10'- 6"	2.010	63.084	2.030	63.084	L	
8	10	48.613	1.069	188.158	10'-10"	6	10'- 6"	2.197	63.084	2.218	63.084	P	
9	4	44.316	0.848	179.518	11'-10"	6	11'- 6"	1.735	69.092	1.758	69.092	D	
9	6	47.140	0.948	159.791	11'-10"	6	11'- 6"	1.920	69.092	1.944	69.092	H	
9	8	49.964	1.046	168.693	11'-10"	6	11'- 6"	2.105	69.092	2.129	69.092	L	
9	10	52.788	1.143	189.675	11'-10"	6	11'- 6"	2.291	69.092	2.315	69.092	P	
9	12	55.612	1.236	269.973	11'-10"	6	11'- 6"	2.476	69.092	2.500	69.092	T	
10	4	48.491	0.925	180.133	12'-10"	6	12'- 6"	1.826	75.100	1.853	75.100	D	
10	6	51.315	1.026	158.894	12'-10"	6	12'- 6"	2.012	75.100	2.039	75.100	H	
10	8	54.139	1.121	200.152	12'-10"	6	12'- 6"	2.197	75.100	2.224	75.100	L	
10	10	56.963	1.219	212.453	12'-10"	6	12'- 6"	2.383	75.100	2.410	75.100	P	
10	12	59.787	1.313	279.378	12'-10"	6	12'- 6"	2.568	75.100	2.595	75.100	T	
12	6	59.665	1.161	275.345	14'-10"	6	14'- 6"	2.197	87.116	2.230	87.116	H	
12	8	62.489	1.239	268.938	14'-10"	6	14'- 6"	2.387	87.116	2.421	87.116	L	
12	10	65.313	1.339	258.134	14'-10"	6	14'- 6"	2.573	87.116	2.606	87.116	P	
12	12	68.137	1.454	318.809	14'-10"	6	14'- 6"	2.753	87.116	2.786	87.116	T	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h1>SINGLE BOX CULVERTS</h1> <h2>0 TO 2 FT. FILLS</h2> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE	SHEET 2 OF 2
		07/11	1002.04

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

DIMENSIONS					REINFORCING STEEL																						
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)	A	B	C	D	E	F	BH1			BH2			BH3			BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS			
											SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH			SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	12"	4'-0"	2'-8"	8'-10"	4	12"	4'-0"	--	--	----	----	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	12"	4'-0"	3'-2"	9'-10"	4	12"	4'-0"	--	--	----	----	4	12"	5'-0"	16	12
4	3	8"	8"	8"	3	3'-0"	3	3'-0"	1	1'-0"	4	12"	5'-0"	2'-8"	9'-10"	5	12"	5'-0"	--	--	----	----	4	12"	4'-0"	20	8
4	4	8"	8"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	12"	5'-0"	3'-2"	10'-10"	5	12"	5'-0"	--	--	----	----	4	12"	5'-0"	20	12
4	5	8"	8"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	12"	5'-0"	3'-8"	11'-10"	5	12"	5'-0"	--	--	----	----	4	12"	6'-0"	20	16
4	6	8"	8"	8"	3	3'-0"	3	3'-0"	4	4'-0"	4	12"	5'-0"	4'-2"	12'-10"	5	12"	5'-0"	--	--	----	----	4	12"	7'-0"	20	20
5	3	8"	8"	8"	4	4'-0"	4	4'-0"	1	1'-0"	4	12"	6'-0"	2'-8"	10'-10"	5	12"	6'-0"	4	12"	2'-6"	4'-9"	4	12"	4'-0"	24	8
5	4	8"	8"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	12"	6'-0"	3'-2"	11'-10"	5	12"	6'-0"	--	--	----	----	4	12"	5'-0"	24	12
5	5	8"	8"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	12"	6'-0"	3'-8"	12'-10"	5	12"	6'-0"	--	--	----	----	4	12"	6'-0"	24	16
5	6	8"	8"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	12"	6'-0"	4'-2"	13'-10"	6	12"	6'-0"	--	--	----	----	4	12"	7'-0"	24	20
5	7	8"	8"	8"	4	4'-0"	4	4'-0"	5	5'-0"	4	12"	6'-0"	4'-8"	14'-10"	6	12"	6'-0"	--	--	----	----	4	12"	8'-0"	24	24
6	4	8"	8"	8"	5	5'-0"	5	5'-0"	2	2'-0"	5	12"	7'-0"	3'-2"	12'-8"	6	12"	7'-0"	--	--	----	----	4	12"	5'-0"	28	12
6	5	8"	8"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	12"	7'-0"	3'-8"	13'-10"	6	12"	7'-0"	4	12"	2'-8 ³ / ₈ "	5'-2"	4	12"	6'-0"	28	16
6	6	8"	8"	8"	5	5'-0"	5	5'-0"	4	4'-0"	4	12"	7'-0"	4'-2"	14'-10"	6	12"	7'-0"	4	12"	2'-8 ³ / ₈ "	5'-2"	4	12"	7'-0"	28	20
6	7	8"	8"	8"	5	5'-0"	5	5'-0"	5	5'-0"	4	10"	7'-0"	4'-8"	15'-10"	6	10"	7'-0"	4	10"	2'-11"	5'-8"	4	12"	8'-0"	28	24
6	8	8"	8"	8"	5	5'-0"	5	5'-0"	6	6'-0"	4	9"	7'-0"	5'-2"	16'-10"	6	9"	7'-0"	4	9"	3'-2"	6'-2"	4	12"	9'-0"	28	28
7	4	8"	8"	8"	6	6'-0"	6	6'-0"	2	2'-0"	5	11"	8'-0"	3'-2"	13'-8"	6	11"	8'-0"	--	--	----	----	4	12"	5'-0"	32	12
7	6	8"	8"	8"	6	6'-0"	6	6'-0"	4	4'-0"	4	9"	8'-0"	4'-2"	15'-10"	6	9"	8'-0"	4	9"	2'-10 ³ / ₄ "	5'-6"	4	12"	7'-0"	32	20
7	8	8"	8"	8"	6	6'-0"	6	6'-0"	6	6'-0"	4	8"	8'-0"	5'-2"	17'-10"	6	8"	8'-0"	3	8"	3'-2"	6'-2"	4	12"	9'-0"	32	28
7	10	8"	8"	8"	6	6'-0"	6	6'-0"	8	8'-0"	5	6"	8'-0"	6'-2"	19'-8"	6	6"	8'-0"	--	--	----	----	5	12"	11'-0"	32	36
8	4	8"	8"	8"	7	7'-0"	7	7'-0"	2	2'-0"	5	9"	9'-0"	3'-2"	14'-8"	6	9"	9'-0"	3	9"	3'-2"	6'-2"	4	11 ¹ / ₂ "	5'-0"	36	12
8	6	8"	8"	8"	7	7'-0"	7	7'-0"	4	4'-0"	4	8"	9'-0"	4'-2"	16'-10"	6	8"	9'-0"	4	8"	3'-2"	6'-2"	4	12"	7'-0"	36	20
8	8	8"	8"	8"	7	7'-0"	7	7'-0"	6	6'-0"	5	7"	9'-0"	5'-2"	18'-8"	6	7"	9'-0"	--	--	----	----	4	12"	9'-0"	36	28
8	10	8"	8"	8"	7	7'-0"	7	7'-0"	8	8'-0"	5	11"	9'-0"	6'-2"	20'-8"	8	11"	9'-0"	4	11"	3'-6"	6'-9"	5	12"	11'-0"	36	36
9	4	8"	8"	8"	8	8'-0"	8	8'-0"	2	2'-0"	5	8"	10'-0"	3'-2"	15'-8"	6	8"	10'-0"	3	8"	3'-3 ³ / ₈ "	6'-5"	4	8"	5'-0"	40	12
9	6	8"	8"	8"	8	8'-0"	8	8'-0"	4	4'-0"	4	7"	10'-0"	4'-2"	17'-10"	6	7"	10'-0"	4	7"	3'-3 ³ / ₈ "	6'-4"	4	11"	7'-0"	40	20
9	8	8 ¹ / ₄ "	8 ¹ / ₄ "	8"	8	8'-0"	8	8'-0"	6	6'-0"	5	10 ¹ / ₂ "	10'-0"	5'-2 ¹ / ₄ "	19'-9"	8	10 ¹ / ₂ "	10'-0"	3	10 ¹ / ₂ "	3'-3 ³ / ₈ "	6'-5"	4	12"	9'-0"	40	28
9	10	8"	8"	8"	8	8'-0"	8	8'-0"	8	8'-0"	5	10"	10'-0"	6'-2"	21'-8"	8	10"	10'-0"	4	10"	3'-6"	6'-9"	5	12"	11'-0"	40	36
9	12	8 ¹ / ₄ "	8 ¹ / ₄ "	8"	8	8'-0"	8	8'-0"	10	10'-0"	5	9 ¹ / ₂ "	10'-0"	7'-2 ¹ / ₄ "	23'-9"	8	9 ¹ / ₂ "	10'-0"	3	9 ¹ / ₂ "	3'-11"	7'-9"	6	11 ¹ / ₂ "	13'-0"	40	44
10	4	8 ³ / ₄ "	8 ³ / ₄ "	8"	9	9'-0"	9	9'-0"	2	2'-0"	6	7"	11'-0"	3'-2 ³ / ₄ "	16'-8"	6	7"	11'-0"	--	--	----	----	5	9 ¹ / ₂ "	5'-2"	44	12
10	6	8 ³ / ₄ "	8 ³ / ₄ "	8"	9	9'-0"	9	9'-0"	4	4'-0"	6	10"	11'-0"	4'-2 ³ / ₄ "	18'-8"	8	10"	11'-0"	--	--	----	----	4	9"	7'-2"	44	20
10	8	8 ³ / ₄ "	8 ³ / ₄ "	8"	9	9'-0"	9	9'-0"	6	6'-0"	6	6"	11'-0"	5'-2 ³ / ₄ "	20'-8"	6	6"	11'-0"	--	--	----	----	4	10"	9'-2"	44	28
10	10	8 ³ / ₄ "	8 ³ / ₄ "	8"	9	9'-0"	9	9'-0"	8	8'-0"	6	9 ¹ / ₂ "	11'-0"	6'-2 ³ / ₄ "	22'-8"	8	9 ¹ / ₂ "	11'-0"	3	9 ¹ / ₂ "	3'-6"	6'-10"	4	9"	11'-2"	44	36
10	12	9 ¹ / ₄ "	9 ¹ / ₄ "	8"	9	9'-0"	9	9'-0"	10	10'-0"	5	8 ¹ / ₂ "	11'-0"	7'-3 ¹ / ₄ "	24'-11"	8	8 ¹ / ₂ "	11'-0"	4	8 ¹ / ₂ "	4'-1"	7'-11"	6	12"	13'-2"	44	44
12	6	9 ¹ / ₂ "	9 ¹ / ₂ "	8"	11	11'-0"	11	11'-0"	4	4'-0"	6	8"	13'-0"	4'-3 ¹ / ₂ "	20'-9"	7	8"	13'-0"	4	8"	3'-10 ³ / ₄ "	7'-6"	4	6 ¹ / ₂ "	7'-3"	52	20
12	8	9 ³ / ₄ "	9 ³ / ₄ "	8"	11	11'-0"	11	11'-0"	6	6'-0"	6	8"	13'-0"	5'-7 ¹ / ₄ "	23'-4"	8	8"	13'-0"	3	8"	3'-10 ³ / ₄ "	7'-7"	4	8 ¹ / ₂ "	9'-3"	52	28
12	10	9 ³ / ₄ "	9 ³ / ₄ "	8"	11	11'-0"	11	11'-0"	8	8'-0"	5	8"	13'-0"	6'-3 ³ / ₄ "	25'-0"	8	8"	13'-0"	4	8"	3'-10 ³ / ₄ "	7'-6"	4	12"	11'-3"	52	36
12	12	10 ¹ / ₂ "	10 ¹ / ₂ "	8"	11	11'-0"	11	11'-0"	10	10'-0"	6	7"	13'-0"	7'-8"	27'-7"	8	7"	13'-0"	--	--	----	----	6	12"	13'-5"	52	44

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.05	07/11

SINGLE BOX CULVERTS
2 TO 5 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH	LENGTH					
3	3	16.184	0.401	36.185	5'-10"	6	5'- 6"	1.038	33.044	1.042	33.044	A	
3	4	17.596	0.450	40.361	5'-10"	6	5'- 6"	1.131	33.044	1.134	33.044	C	
4	3	19.524	0.450	45.279	6'-10"	6	6'- 6"	1.139	39.052	1.146	39.052	A	
4	4	20.936	0.499	49.455	6'-10"	6	6'- 6"	1.232	39.052	1.239	39.052	C	
4	5	22.348	0.548	53.631	6'-10"	6	6'- 6"	1.324	39.052	1.332	39.052	E	
4	6	23.760	0.597	57.807	6'-10"	6	6'- 6"	1.417	39.052	1.424	39.052	G	
5	3	22.864	0.498	64.065	7'-10"	6	7'- 6"	1.240	45.060	1.251	45.060	A	
5	4	24.276	0.548	55.549	7'-10"	6	7'- 6"	1.333	45.060	1.343	45.060	C	
5	5	25.688	0.597	59.725	7'-10"	6	7'- 6"	1.426	45.060	1.436	45.060	E	
5	6	27.100	0.645	69.409	7'-10"	6	7'- 6"	1.518	45.060	1.529	45.060	G	
5	7	28.512	0.695	73.585	7'-10"	6	7'- 6"	1.611	45.060	1.621	45.060	I	
6	4	27.616	0.595	77.347	8'-10"	6	8'- 6"	1.434	51.068	1.448	51.068	C	
6	5	29.028	0.644	86.051	8'-10"	6	8'- 6"	1.527	51.068	1.541	51.068	E	
6	6	30.440	0.693	90.227	8'-10"	6	8'- 6"	1.620	51.068	1.633	51.068	G	
6	7	31.852	0.741	109.627	8'-10"	6	8'- 6"	1.712	51.068	1.726	51.068	I	
6	8	33.264	0.789	124.645	8'-10"	6	8'- 6"	1.805	51.068	1.819	51.068	K	
7	4	30.956	0.644	89.885	9'-10"	6	9'- 6"	1.535	57.076	1.552	57.076	C	
7	6	33.780	0.741	118.090	9'-10"	6	9'- 6"	1.721	57.076	1.738	57.076	G	
7	8	36.604	0.838	132.362	9'-10"	6	9'- 6"	1.906	57.076	1.923	57.076	K	
7	10	39.428	0.933	190.758	9'-10"	6	9'- 6"	2.092	57.076	2.109	57.076	O	
8	4	34.296	0.691	126.785	10'-10"	6	10'- 6"	1.636	63.084	1.657	63.084	C	
8	6	37.120	0.788	142.648	10'-10"	6	10'- 6"	1.822	63.084	1.842	63.084	G	
8	8	39.944	0.886	159.699	10'-10"	6	10'- 6"	2.007	63.084	2.028	63.084	K	
8	10	42.768	0.983	183.378	10'-10"	6	10'- 6"	2.193	63.084	2.213	63.084	O	
9	4	37.636	0.738	149.809	11'-10"	6	11'- 6"	1.738	69.092	1.761	69.092	C	
9	6	40.460	0.836	165.793	11'-10"	6	11'- 6"	1.923	69.092	1.947	69.092	G	
9	8	43.284	0.950	168.414	11'-10"	6	11'- 6"	2.105	69.092	2.129	69.092	K	
9	10	46.108	1.030	206.737	11'-10"	6	11'- 6"	2.294	69.092	2.318	69.092	O	
9	12	48.932	1.143	231.984	11'-10"	6	11'- 6"	2.476	69.092	2.500	69.092	S	
10	4	40.976	0.837	189.993	12'-10"	6	12'- 6"	1.827	75.100	1.854	75.100	C	
10	6	43.800	0.936	187.456	12'-10"	6	12'- 6"	2.013	75.100	2.040	75.100	G	
10	8	46.624	1.030	244.869	12'-10"	6	12'- 6"	2.198	75.100	2.225	75.100	K	
10	10	49.448	1.130	239.860	12'-10"	6	12'- 6"	2.383	75.100	2.411	75.100	O	
10	12	52.272	1.261	276.287	12'-10"	6	12'- 6"	2.580	75.100	2.607	75.100	T	
12	6	50.480	1.100	263.413	14'-10"	6	14'- 6"	2.213	87.116	2.246	87.116	H	
12	8	53.304	1.218	286.836	14'-10"	6	14'- 6"	2.393	87.116	2.426	87.116	L	
12	10	56.128	1.317	275.717	14'-10"	6	14'- 6"	2.578	87.116	2.612	87.116	P	
12	12	58.952	1.472	350.844	14'-10"	6	14'- 6"	2.747	87.116	2.781	87.116	T	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h1>SINGLE BOX CULVERTS</h1> <h2>2 TO 5 FT. FILLS</h2> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE 07/11	SHEET 2 OF 2 1002.06

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

DIMENSIONS					REINFORCING STEEL																						
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)	A	B	C	D	E	F	BH1				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS	
											SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C			LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	12"	4'-0"	2'-8"	8'-10"	4	12"	4'-0"	--	--	----	----	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	12"	4'-0"	3'-2"	9'-10"	4	12"	4'-0"	--	--	----	----	4	12"	5'-0"	16	12
4	3	8"	8"	8"	3	3'-0"	3	3'-0"	1	1'-0"	4	11 1/2"	5'-0"	2'-8"	9'-10"	4	11 1/2"	5'-0"	--	--	----	----	4	12"	4'-0"	20	8
4	4	8"	8"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	11"	5'-0"	3'-2"	10'-10"	4	11"	5'-0"	--	--	----	----	4	12"	5'-0"	20	12
4	5	8"	8"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	12"	5'-0"	3'-8"	11'-10"	5	12"	5'-0"	3	12"	2'-3 5/8"	4'-5"	4	12"	6'-0"	20	16
4	6	8"	8"	8"	3	3'-0"	3	3'-0"	4	4'-0"	4	12"	5'-0"	4'-2"	12'-10"	5	12"	5'-0"	3	12"	2'-9"	5'-5"	4	12"	7'-0"	20	20
5	3	8"	8"	8"	4	4'-0"	4	4'-0"	1	1'-0"	4	12"	6'-0"	2'-8"	10'-10"	5	12"	6'-0"	--	--	----	----	4	12"	4'-0"	24	8
5	4	8"	8"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	11 1/2"	6'-0"	3'-2"	11'-10"	5	11 1/2"	6'-0"	--	--	----	----	4	12"	5'-0"	24	12
5	5	8"	8"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	11"	6'-0"	3'-8"	12'-10"	5	11"	6'-0"	--	--	----	----	4	12"	6'-0"	24	16
5	6	8"	8"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	10 1/2"	6'-0"	4'-2"	13'-10"	5	10 1/2"	6'-0"	--	--	----	----	4	12"	7'-0"	24	20
5	7	8"	8"	8"	4	4'-0"	4	4'-0"	5	5'-0"	4	10"	6'-0"	4'-8"	14'-10"	5	10"	6'-0"	--	--	----	----	4	12"	8'-0"	24	24
6	4	8"	8"	8"	5	5'-0"	5	5'-0"	2	2'-0"	4	9 1/2"	7'-0"	3'-2"	12'-10"	5	9 1/2"	7'-0"	--	--	----	----	4	12"	5'-0"	28	12
6	5	8"	8"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	11 1/2"	7'-0"	3'-8"	13'-10"	6	11 1/2"	7'-0"	4	11 1/2"	2'-8 3/8"	5'-2"	4	12"	6'-0"	28	16
6	6	8"	8"	8"	5	5'-0"	5	5'-0"	4	4'-0"	4	11"	7'-0"	4'-2"	14'-10"	6	11"	7'-0"	3	11"	2'-8 3/8"	5'-2"	4	12"	7'-0"	28	20
6	7	8"	8"	8"	5	5'-0"	5	5'-0"	5	5'-0"	4	10 1/2"	7'-0"	4'-8"	15'-10"	6	10 1/2"	7'-0"	3	10 1/2"	2'-11"	5'-8"	4	12"	8'-0"	28	24
6	8	8"	8"	8"	5	5'-0"	5	5'-0"	6	6'-0"	4	10"	7'-0"	5'-2"	16'-10"	6	10"	7'-0"	4	10"	3'-2"	6'-2"	5	12"	9'-0"	28	28
7	4	8"	8"	8"	6	6'-0"	6	6'-0"	2	2'-0"	5	10"	8'-0"	3'-2"	13'-8"	6	10"	8'-0"	3	10"	2'-10 3/4"	5'-7"	4	9"	5'-0"	32	12
7	6	8"	8"	8"	6	6'-0"	6	6'-0"	4	4'-0"	4	9"	8'-0"	4'-2"	15'-10"	6	9"	8'-0"	3	9"	2'-10 3/4"	5'-7"	4	12"	7'-0"	32	20
7	8	8"	8"	8"	6	6'-0"	6	6'-0"	6	6'-0"	4	8 1/2"	8'-0"	5'-2"	17'-10"	6	8 1/2"	8'-0"	3	8 1/2"	3'-2"	6'-2"	4	12"	9'-0"	32	28
7	10	8"	8"	8"	6	6'-0"	6	6'-0"	8	8'-0"	4	7 1/2"	8'-0"	6'-2"	19'-10"	6	7 1/2"	8'-0"	3	7 1/2"	3'-6"	6'-9"	5	9"	11'-0"	32	36
8	4	8"	8"	8"	7	7'-0"	7	7'-0"	2	2'-0"	5	8 1/2"	9'-0"	3'-2"	14'-8"	6	8 1/2"	9'-0"	3	8 1/2"	3'-2"	6'-2"	4	6"	5'-0"	36	12
8	6	8"	8"	8"	7	7'-0"	7	7'-0"	4	4'-0"	4	7 1/2"	9'-0"	4'-2"	16'-10"	6	7 1/2"	9'-0"	3	7 1/2"	3'-2"	6'-2"	4	9"	7'-0"	36	20
8	8	8"	8"	8"	7	7'-0"	7	7'-0"	6	6'-0"	4	7"	9'-0"	5'-2"	18'-10"	6	7"	9'-0"	3	7"	3'-2"	6'-2"	4	12"	9'-0"	36	28
8	10	8"	8"	8"	7	7'-0"	7	7'-0"	8	8'-0"	4	6 1/2"	9'-0"	6'-2"	20'-10"	6	6 1/2"	9'-0"	3	6 1/2"	3'-6"	6'-9"	5	9"	11'-0"	36	36
9	4	8"	8"	8"	8	8'-0"	8	8'-0"	2	2'-0"	5	7 1/2"	10'-0"	3'-2"	15'-8"	6	7 1/2"	10'-0"	3	7 1/2"	3'-3 5/8"	6'-5"	4	5 1/2"	5'-0"	40	12
9	6	8 1/4"	8 1/4"	8"	8	8'-0"	8	8'-0"	4	4'-0"	5	6 1/2"	10'-0"	4'-2 1/4"	17'-9"	6	6 1/2"	10'-0"	--	--	----	----	4	7 1/2"	7'-0"	40	20
9	8	8 1/4"	8 1/4"	8"	8	8'-0"	8	8'-0"	6	6'-0"	4	6"	10'-0"	5'-2 1/4"	19'-10"	6	6"	10'-0"	3	6"	3'-3 5/8"	6'-5"	4	10 1/2"	9'-0"	40	28
9	10	8 1/2"	8 1/2"	8"	8	8'-0"	8	8'-0"	8	8'-0"	5	7 1/2"	10'-0"	6'-2 1/2"	21'-9"	7	7 1/2"	10'-0"	3	7 1/2"	3'-6"	6'-9"	5	10"	11'-1"	40	36
9	12	9"	9"	8"	8	8'-0"	8	8'-0"	10	10'-0"	6	8 1/2"	10'-0"	7'-3"	23'-8"	8	8 1/2"	10'-0"	--	--	----	----	7	12"	13'-2"	40	44
10	4	8 1/4"	8 1/4"	8"	9	9'-0"	9	9'-0"	2	2'-0"	5	6 1/2"	11'-0"	3'-2 1/4"	16'-9"	6	6 1/2"	11'-0"	3	6 1/2"	3'-6"	6'-10"	5	6"	5'-0"	44	12
10	6	8 1/2"	8 1/2"	8"	9	9'-0"	9	9'-0"	4	4'-0"	6	7 1/2"	11'-0"	4'-2 1/2"	18'-7"	7	7 1/2"	11'-0"	--	--	----	----	4	6"	7'-1"	44	20
10	8	8 3/4"	8 3/4"	8"	9	9'-0"	9	9'-0"	6	6'-0"	4	5 1/2"	11'-0"	5'-2 3/4"	20'-11"	6	5 1/2"	11'-0"	3	5 1/2"	3'-6"	6'-10"	4	9"	9'-2"	44	28
10	10	9 1/4"	9 1/4"	8"	9	9'-0"	9	9'-0"	8	8'-0"	4	5"	11'-0"	6'-3 1/4"	23'-0"	6	5"	11'-0"	--	--	----	----	5	12"	11'-2"	44	36
10	12	9 1/4"	9 1/4"	10"	9	9'-0"	9	9'-0"	10	10'-0"	4	8"	11'-4"	7'-3 1/4"	25'-4"	8	8"	11'-0"	4	8"	4'-1"	7'-11"	6	12"	13'-2"	44	44
12	6	10 3/4"	10 3/4"	8"	11	11'-0"	11	11'-0"	4	4'-0"	6	7 1/2"	13'-0"	4'-4 3/4"	21'-0"	8	7 1/2"	13'-0"	3	7 1/2"	3'-10 3/4"	7'-7"	4	5 1/2"	7'-5"	52	20
12	8	10 3/4"	10 3/4"	8"	11	11'-0"	11	11'-0"	6	6'-0"	5	6"	13'-0"	5'-4 3/4"	23'-2"	7	6"	13'-0"	--	--	----	----	4	7 1/2"	9'-5"	52	28
12	10	11"	11"	8"	11	11'-0"	11	11'-0"	8	8'-0"	5	7"	13'-0"	6'-5"	25'-2"	8	7"	13'-0"	3	7"	3'-10 3/4"	7'-7"	4	10 1/2"	11'-6"	52	36
12	12	11 1/4"	11 1/4"	10"	11	11'-0"	11	11'-0"	10	10'-0"	5	6 1/2"	13'-4"	7'-5 1/4"	27'-7"	8	6 1/2"	13'-0"	3	6 1/2"	4'-2"	8'-1"	6	12"	13'-6"	52	44

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2 REVISION DATE
1002.07 07/11

SINGLE BOX CULVERTS
5 TO 10 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.


SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH	LENGTH					
3	3	16.184	0.401	36.185	5'-10"	6	5'- 6"	1.038	33.044	1.042	33.044	A	
3	4	17.596	0.450	40.361	5'-10"	6	5'- 6"	1.131	33.044	1.134	33.044	C	
4	3	19.524	0.450	42.391	6'-10"	6	6'- 6"	1.139	39.052	1.146	39.052	A	
4	4	20.936	0.499	47.628	6'-10"	6	6'- 6"	1.232	39.052	1.239	39.052	C	
4	5	22.348	0.547	60.274	6'-10"	6	6'- 6"	1.324	39.052	1.332	39.052	E	
4	6	23.760	0.596	67.580	6'-10"	6	6'- 6"	1.417	39.052	1.424	39.052	G	
5	3	22.864	0.499	51.373	7'-10"	6	7'- 6"	1.240	45.060	1.251	45.060	A	
5	4	24.276	0.548	56.781	7'-10"	6	7'- 6"	1.333	45.060	1.343	45.060	C	
5	5	25.688	0.597	62.422	7'-10"	6	7'- 6"	1.426	45.060	1.436	45.060	E	
5	6	27.100	0.646	68.330	7'-10"	6	7'- 6"	1.518	45.060	1.529	45.060	G	
5	7	28.512	0.694	74.544	7'-10"	6	7'- 6"	1.611	45.060	1.621	45.060	I	
6	4	27.616	0.596	69.998	8'-10"	6	8'- 6"	1.434	51.068	1.448	51.068	C	
6	5	29.028	0.644	88.369	8'-10"	6	8'- 6"	1.527	51.068	1.541	51.068	E	
6	6	30.440	0.693	88.612	8'-10"	6	8'- 6"	1.620	51.068	1.633	51.068	G	
6	7	31.852	0.742	98.634	8'-10"	6	8'- 6"	1.712	51.068	1.726	51.068	I	
6	8	33.264	0.790	122.571	8'-10"	6	8'- 6"	1.805	51.068	1.819	51.068	K	
7	4	30.956	0.643	107.920	9'-10"	6	9'- 6"	1.535	57.076	1.552	57.076	C	
7	6	33.780	0.741	109.692	9'-10"	6	9'- 6"	1.721	57.076	1.738	57.076	G	
7	8	36.604	0.839	126.917	9'-10"	6	9'- 6"	1.906	57.076	1.923	57.076	K	
7	10	39.428	0.935	165.192	9'-10"	6	9'- 6"	2.092	57.076	2.109	57.076	O	
8	4	34.296	0.690	138.922	10'-10"	6	10'- 6"	1.636	63.084	1.657	63.084	C	
8	6	37.120	0.788	140.651	10'-10"	6	10'- 6"	1.822	63.084	1.842	63.084	G	
8	8	39.944	0.886	154.019	10'-10"	6	10'- 6"	2.007	63.084	2.028	63.084	K	
8	10	42.768	0.982	190.266	10'-10"	6	10'- 6"	2.193	63.084	2.213	63.084	O	
9	4	37.636	0.737	161.601	11'-10"	6	11'- 6"	1.738	69.092	1.761	69.092	C	
9	6	40.460	0.851	173.018	11'-10"	6	11'- 6"	1.920	69.092	1.944	69.092	G	
9	8	43.284	0.949	183.366	11'-10"	6	11'- 6"	2.105	69.092	2.129	69.092	K	
9	10	46.108	1.061	226.058	11'-10"	6	11'- 6"	2.288	69.092	2.311	69.092	O	
9	12	48.932	1.188	275.274	11'-10"	6	11'- 6"	2.467	69.092	2.491	69.092	S	
10	4	40.976	0.801	199.247	12'-10"	6	12'- 6"	1.835	75.100	1.862	75.100	C	
10	6	43.800	0.916	217.106	12'-10"	6	12'- 6"	2.016	75.100	2.043	75.100	G	
10	8	46.624	1.033	211.738	12'-10"	6	12'- 6"	2.198	75.100	2.225	75.100	K	
10	10	49.448	1.166	223.119	12'-10"	6	12'- 6"	2.394	75.100	2.421	75.100	P	
10	12	52.272	1.429	253.959	12'-10"	6	12'- 6"	2.580	75.100	2.607	75.100	T	
12	6	50.480	1.201	294.130	14'-10"	6	14'- 6"	2.186	87.116	2.219	87.116	H	
12	8	53.304	1.301	268.332	14'-10"	6	14'- 6"	2.371	87.116	2.405	87.116	L	
12	10	56.128	1.419	294.385	14'-10"	6	14'- 6"	2.551	87.116	2.585	87.116	P	
12	12	58.952	1.705	351.150	14'-10"	6	14'- 6"	2.731	87.116	2.765	87.116	T	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h1>SINGLE BOX CULVERTS</h1> <h2>5 TO 10 FT. FILLS</h2> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE 07/11	SHEET 2 OF 2 1002.08

DIMENSIONS					REINFORCING STEEL																						
SPAN	HGHT	T1	T2	T3						BH1			BH2			BH3			BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS				
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a			LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	12"	4'-0"	2'-8"	8'-10"	5	12"	4'-0"	3	12"	2'-2"	4'-1"	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	12"	4'-0"	3'-2"	9'-10"	5	12"	4'-0"	--	---	-----	-----	4	12"	5'-0"	16	12
4	3	8"	8"	8"	3	3'-0"	3	3'-0"	1	1'-0"	4	10 1/2"	5'-0"	2'-8"	9'-10"	5	10 1/2"	5'-0"	--	---	-----	-----	4	12"	4'-0"	20	8
4	4	8"	8"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	10"	5'-0"	3'-2"	10'-10"	5	10"	5'-0"	--	---	-----	-----	4	12"	5'-0"	20	12
4	5	8"	8"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	9 1/2"	5'-0"	3'-8"	11'-10"	5	9 1/2"	5'-0"	--	---	-----	-----	4	12"	6'-0"	20	16
4	6	8"	8"	8"	3	3'-0"	3	3'-0"	4	4'-0"	4	9 1/2"	5'-0"	4'-2"	12'-10"	5	9 1/2"	5'-0"	--	---	-----	-----	4	12"	7'-0"	20	20
5	3	8"	8"	8"	4	4'-0"	4	4'-0"	1	1'-0"	5	10 1/2"	6'-0"	2'-10"	11'-1"	6	10 1/2"	6'-0"	--	---	-----	-----	4	9"	4'-0"	24	8
5	4	8"	8"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	10"	6'-0"	3'-2"	11'-10"	6	10"	6'-0"	3	10"	2'-6"	4'-10"	4	12"	5'-0"	24	12
5	5	8"	8"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	9 1/2"	6'-0"	3'-8"	12'-10"	6	9 1/2"	6'-0"	3	9 1/2"	2'-6"	4'-10"	4	12"	6'-0"	24	16
5	6	8"	8"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	9"	6'-0"	4'-2"	13'-10"	6	9"	6'-0"	--	---	-----	-----	4	12"	7'-0"	24	20
5	7	8"	8"	8"	4	4'-0"	4	4'-0"	5	5'-0"	4	9"	6'-0"	4'-8"	14'-10"	6	9"	6'-0"	--	---	-----	-----	5	12"	8'-0"	24	24
6	4	8 3/4"	8 3/4"	8"	5	5'-0"	5	5'-0"	2	2'-0"	5	8"	7'-0"	3'-5"	13'-2"	6	8"	7'-0"	--	---	-----	-----	4	9"	5'-2"	28	12
6	5	8 3/4"	8 3/4"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	8"	7'-0"	3'-9"	14'-0"	6	8"	7'-0"	3	8"	2'-9"	5'-3"	4	12"	6'-2"	28	16
6	6	8 3/4"	8 3/4"	8"	5	5'-0"	5	5'-0"	4	4'-0"	4	7 1/2"	7'-0"	4'-3"	15'-0"	6	7 1/2"	7'-0"	3	7 1/2"	2'-10"	5'-4"	4	12"	7'-2"	28	20
6	7	8 3/4"	8 3/4"	8"	5	5'-0"	5	5'-0"	5	5'-0"	4	7 1/2"	7'-0"	4'-9"	16'-0"	6	7 1/2"	7'-0"	3	7 1/2"	3'-0"	5'-9"	5	12"	8'-1"	28	24
6	8	8 3/4"	8 3/4"	8"	5	5'-0"	5	5'-0"	6	6'-0"	5	7"	7'-0"	5'-5"	17'-2"	6	7"	7'-0"	--	---	-----	-----	6	12"	9'-1"	28	28
7	4	9 3/4"	9 3/4"	8"	6	6'-0"	6	6'-0"	2	2'-0"	4	7"	8'-0"	3'-4"	14'-2"	6	7"	8'-0"	3	7"	2'-11"	5'-8"	4	7 1/2"	5'-3"	32	12
7	6	10"	10"	8"	6	6'-0"	6	6'-0"	4	4'-0"	4	6 1/2"	8'-0"	4'-4"	16'-2"	6	6 1/2"	8'-0"	--	---	-----	-----	4	12"	7'-4"	32	20
7	8	10"	10"	8"	6	6'-0"	6	6'-0"	6	6'-0"	5	6 1/2"	8'-0"	5'-6"	18'-5"	6	6 1/2"	8'-0"	--	---	-----	-----	5	12"	9'-4"	32	28
7	10	10"	10"	8"	6	6'-0"	6	6'-0"	8	8'-0"	5	7 1/2"	8'-0"	6'-6"	20'-5"	7	7 1/2"	8'-0"	3	7 1/2"	3'-8"	7'-2"	6	9 1/2"	11'-4"	32	36
8	4	10 3/4"	10 3/4"	8"	7	7'-0"	7	7'-0"	2	2'-0"	4	6"	9'-0"	3'-5"	15'-4"	6	6"	9'-0"	3	6"	3'-2"	6'-1"	4	6 1/2"	5'-5"	36	12
8	6	11"	11"	8"	7	7'-0"	7	7'-0"	4	4'-0"	5	7"	9'-0"	4'-8"	17'-7"	7	7"	9'-0"	--	---	-----	-----	4	11"	7'-6"	36	20
8	8	11 1/4"	11 1/4"	8"	7	7'-0"	7	7'-0"	6	6'-0"	5	9"	9'-0"	5'-8"	19'-7"	8	9"	9'-0"	3	9"	3'-5"	6'-7"	5	12"	9'-6"	36	28
8	10	11 1/4"	11 1/4"	8"	7	7'-0"	7	7'-0"	8	8'-0"	5	5 1/2"	9'-0"	6'-8"	21'-7"	6	5 1/2"	9'-0"	--	---	-----	-----	6	10 1/2"	11'-6"	36	36
9	4	12"	12"	8"	8	8'-0"	8	8'-0"	2	2'-0"	4	5 1/2"	10'-0"	3'-6"	16'-6"	6	5 1/2"	10'-0"	3	5 1/2"	3'-4"	6'-5"	4	6"	5'-8"	40	12
9	6	12 1/4"	12 1/4"	8"	8	8'-0"	8	8'-0"	4	4'-0"	5	8"	10'-0"	4'-9"	18'-9"	8	8"	10'-0"	--	---	-----	-----	4	10"	7'-9"	40	20
9	8	12 1/4"	12 1/4"	8"	8	8'-0"	8	8'-0"	6	6'-0"	4	6 1/2"	10'-0"	5'-7"	20'-7"	7	6 1/2"	10'-0"	3	6 1/2"	3'-6"	6'-9"	5	12"	9'-8"	40	28
9	10	12 1/2"	12 1/2"	8"	8	8'-0"	8	8'-0"	8	8'-0"	5	6"	10'-0"	6'-9"	22'-10"	7	6"	10'-0"	--	---	-----	-----	7	12"	11'-8"	40	36
9	12	12 1/2"	12 1/2"	9"	8	8'-0"	8	8'-0"	10	10'-0"	6	7 1/2"	10'-2"	7'-11"	25'-2"	8	7 1/2"	10'-1"	3	7 1/2"	4'-4"	8'-5"	5	5 1/2"	13'-8"	40	44
10	4	13"	13"	8"	9	9'-0"	9	9'-0"	2	2'-0"	5	6"	11'-0"	3'-9"	17'-11"	7	6"	11'-0"	--	---	-----	-----	4	5"	5'-10"	44	12
10	6	13"	13"	8"	9	9'-0"	9	9'-0"	4	4'-0"	5	7 1/2"	11'-0"	4'-9"	19'-11"	8	7 1/2"	11'-0"	3	7 1/2"	3'-6"	6'-10"	4	8"	7'-10"	44	20
10	8	13"	13"	8"	9	9'-0"	9	9'-0"	6	6'-0"	5	7 1/2"	11'-0"	5'-9"	21'-11"	8	7 1/2"	11'-0"	3	7 1/2"	3'-7"	6'-11"	4	12"	9'-10"	44	28
10	10	13"	13"	8"	9	9'-0"	9	9'-0"	8	8'-0"	5	5 1/2"	11'-0"	6'-9"	23'-11"	7	5 1/2"	11'-0"	--	---	-----	-----	6	12"	11'-10"	44	36
10	12	13"	13"	9"	9	9'-0"	9	9'-0"	10	10'-0"	7	7"	11'-2"	8'-3"	26'-7"	8	7"	11'-1"	--	---	-----	-----	5	6"	13'-10"	44	44
12	6	15"	15"	8"	11	11'-0"	11	11'-0"	4	4'-0"	5	6 1/2"	13'-0"	4'-11"	22'-3"	8	6 1/2"	13'-0"	--	---	-----	-----	4	6"	8'-2"	52	20
12	8	15 1/4"	15 1/4"	8"	11	11'-0"	11	11'-0"	6	6'-0"	6	6"	13'-0"	6'-2"	24'-5"	8	6"	13'-0"	--	---	-----	-----	4	10"	10'-3"	52	28
12	10	15 1/4"	15 1/4"	8"	11	11'-0"	11	11'-0"	8	8'-0"	4	6"	13'-0"	6'-10"	26'-1"	8	6"	13'-0"	4	6"	4'-2"	8'-0"	6	12"	12'-2"	52	36
12	12	15 1/4"	15 1/4"	9 1/2"	11	11'-0"	11	11'-0"	10	10'-0"	6	6"	13'-3"	8'-2"	28'-8"	8	6"	13'-3"	--	---	-----	-----	5	6 1/2"	14'-2"	52	44

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.09	07/11

SINGLE BOX CULVERTS
10 TO 20 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE


SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS./LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH	LENGTH					
3	3	16.184	0.400	46.498	5'-10"	6	5'-6"	1.038	33.044	1.042	33.044	A	
3	4	17.596	0.450	44.657	5'-10"	6	5'-6"	1.131	33.044	1.134	33.044	C	
4	3	19.524	0.449	50.604	6'-10"	6	6'-6"	1.139	39.052	1.146	39.052	A	
4	4	20.936	0.498	56.391	6'-10"	6	6'-6"	1.232	39.052	1.239	39.052	C	
4	5	22.348	0.547	62.489	6'-10"	6	6'-6"	1.324	39.052	1.332	39.052	E	
4	6	23.760	0.596	67.017	6'-10"	6	6'-6"	1.417	39.052	1.424	39.052	G	
5	3	22.864	0.497	75.669	7'-10"	6	7'-6"	1.240	45.060	1.251	45.060	A	
5	4	24.276	0.546	79.112	7'-10"	6	7'-6"	1.333	45.060	1.343	45.060	C	
5	5	25.688	0.595	86.230	7'-10"	6	7'-6"	1.426	45.060	1.436	45.060	E	
5	6	27.100	0.644	84.196	7'-10"	6	7'-6"	1.518	45.060	1.529	45.060	G	
5	7	28.512	0.693	94.817	7'-10"	6	7'-6"	1.611	45.060	1.621	45.060	I	
6	4	27.616	0.627	108.307	8'-10"	6	8'-6"	1.432	51.068	1.446	51.068	C	
6	5	29.028	0.676	107.430	8'-10"	6	8'-6"	1.524	51.068	1.538	51.068	E	
6	6	30.440	0.725	117.454	8'-10"	6	8'-6"	1.617	51.068	1.631	51.068	G	
6	7	31.852	0.773	129.488	8'-10"	6	8'-6"	1.710	51.068	1.724	51.068	I	
6	8	33.264	0.821	157.284	8'-10"	6	8'-6"	1.803	51.068	1.816	51.068	K	
7	4	30.956	0.731	129.127	9'-10"	6	9'-6"	1.543	57.076	1.560	57.076	D	
7	6	33.780	0.843	126.868	9'-10"	6	9'-6"	1.727	57.076	1.744	57.076	H	
7	8	36.604	0.938	170.365	9'-10"	6	9'-6"	1.912	57.076	1.929	57.076	L	
7	10	39.428	1.033	219.296	9'-10"	6	9'-6"	2.098	57.076	2.115	57.076	P	
8	4	34.296	0.846	159.600	10'-10"	6	10'-6"	1.630	63.084	1.650	63.084	D	
8	6	37.120	0.958	172.840	10'-10"	6	10'-6"	1.813	63.084	1.833	63.084	H	
8	8	39.944	1.070	190.718	10'-10"	6	10'-6"	1.996	63.084	2.016	63.084	L	
8	10	42.768	1.165	238.930	10'-10"	6	10'-6"	2.181	63.084	2.202	63.084	P	
9	4	37.636	0.990	186.271	11'-10"	6	11'-6"	1.707	69.092	1.731	69.092	D	
9	6	40.460	1.105	190.592	11'-10"	6	11'-6"	1.889	69.092	1.913	69.092	H	
9	8	43.284	1.202	207.534	11'-10"	6	11'-6"	2.075	69.092	2.098	69.092	L	
9	10	46.108	1.312	270.322	11'-10"	6	11'-6"	2.257	69.092	2.281	69.092	P	
9	12	48.932	1.492	338.890	11'-10"	6	11'-6"	2.442	69.092	2.466	69.092	T	
10	4	40.976	1.132	222.972	12'-10"	6	12'-6"	1.780	75.100	1.807	75.100	D	
10	6	43.800	1.229	235.180	12'-10"	6	12'-6"	1.966	75.100	1.993	75.100	H	
10	8	46.624	1.328	242.383	12'-10"	6	12'-6"	2.151	75.100	2.178	75.100	L	
10	10	49.448	1.423	291.088	12'-10"	6	12'-6"	2.337	75.100	2.364	75.100	P	
10	12	52.272	1.601	398.098	12'-10"	6	12'-6"	2.522	75.100	2.549	75.100	T	
12	6	50.480	1.551	284.965	14'-10"	6	14'-6"	2.094	87.116	2.128	87.116	H	
12	8	53.304	1.665	354.490	14'-10"	6	14'-6"	2.293	87.116	2.326	87.116	M	
12	10	56.128	1.764	343.084	14'-10"	6	14'-6"	2.478	87.116	2.512	87.116	Q	
12	12	58.952	1.991	427.061	14'-10"	6	14'-6"	2.663	87.116	2.697	87.116	U	

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SPECIFICATION REFERENCE	<h2 style="text-align: center;">SINGLE BOX CULVERTS</h2> <h3 style="text-align: center;">10 TO 20 FT. FILLS</h3> <p style="text-align: center;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>		 ROAD AND BRIDGE STANDARDS	
			REVISION DATE 07/11	SHEET 2 OF 2 1002.10

DIMENSIONS					REINFORCING STEEL																						
SPAN	HGHT	T1	T2	T3	BHI				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #5 BARS							
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH			SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	1 1/2"	4'-0"	2'-8"	8'-10"	5	1 1/2"	4'-0"	--	----	----	-----	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	1 1/2"	4'-0"	3'-2"	9'-10"	5	1 1/2"	4'-0"	--	----	----	-----	4	12"	5'-0"	16	12
4	3	8"	8"	8"	3	3'-0"	3	3'-0"	1	1'-0"	4	1 1/2"	5'-0"	2'-8"	9'-10"	6	1 1/2"	5'-0"	4	1 1/2"	2'-4"	4' - 5"	4	1 1/2"	4'-0"	20	8
4	4	8"	8"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	1 1/2"	5'-0"	3'-2"	10'-10"	6	1 1/2"	5'-0"	3	1 1/2"	2'-4"	4' - 5"	4	1 1/2"	5'-0"	20	12
4	5	8"	8"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	9/2"	5'-0"	3'-8"	11'-10"	6	9/2"	5'-0"	3	9/2"	2'-6"	4' - 10"	4	12"	6'-0"	20	16
4	6	8"	8"	8"	3	3'-0"	3	3'-0"	4	4'-0"	4	9/2"	5'-0"	4'-2"	12'-10"	6	9/2"	5'-0"	3	9/2"	2'-9"	5' - 3"	5	12"	7'-0"	20	20
5	3	9 1/2"	9 1/2"	8"	4	4'-0"	4	4'-0"	1	1'-0"	4	8 1/2"	6'-0"	2'-10"	11'-1"	6	8 1/2"	6'-0"	3	8 1/2"	2'-6"	4' - 10"	4	9"	4'-3"	24	8
5	4	9 3/4"	9 3/4"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	8"	6'-0"	3'-4"	12'-2"	6	8"	6'-0"	--	----	----	-----	4	12"	5'-3"	24	12
5	5	9 3/4"	9 3/4"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	8"	6'-0"	3'-10"	13'-2"	6	8"	6'-0"	--	----	----	-----	4	12"	6'-3"	24	16
5	6	9 3/4"	9 3/4"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	8"	6'-0"	4'-4"	14'-2"	6	8"	6'-0"	--	----	----	-----	5	12"	7'-3"	24	20
5	7	9 3/4"	9 3/4"	8"	4	4'-0"	4	4'-0"	5	5'-0"	4	8"	6'-0"	4'-10"	15'-2"	6	8"	6'-0"	--	----	----	-----	6	12"	8'-3"	24	24
6	4	11 1/2"	11 1/2"	8"	5	5'-0"	5	5'-0"	2	2'-0"	4	7"	7'-0"	3'-6"	13'-5"	6	7"	7'-0"	--	----	----	-----	4	12"	5'-7"	28	12
6	5	11 1/2"	11 1/2"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	6 1/2"	7'-0"	4'-0"	14'-5"	6	6 1/2"	7'-0"	--	----	----	-----	4	12"	6'-7"	28	16
6	6	11 1/2"	11 1/2"	8"	5	5'-0"	5	5'-0"	4	4'-0"	4	6 1/2"	7'-0"	4'-6"	15'-5"	6	6 1/2"	7'-0"	--	----	----	-----	4	12"	7'-7"	28	20
6	7	11 1/2"	11 1/2"	8"	5	5'-0"	5	5'-0"	5	5'-0"	4	6 1/2"	7'-0"	5'-0"	16'-5"	6	6 1/2"	7'-0"	--	----	----	-----	5	12"	8'-6"	28	24
6	8	11 1/2"	11 1/2"	8"	5	5'-0"	5	5'-0"	6	6'-0"	4	6 1/2"	7'-0"	5'-6"	17'-5"	6	6 1/2"	7'-0"	--	----	----	-----	6	10 1/2"	9'-7"	28	28
7	4	13"	13"	8"	6	6'-0"	6	6'-0"	2	2'-0"	4	6"	8'-0"	3'-7"	14'-8"	6	6"	8'-0"	--	----	----	-----	4	10 1/2"	5'-10"	32	12
7	6	13"	13"	8"	6	6'-0"	6	6'-0"	4	4'-0"	5	7 1/2"	8'-0"	4'-9"	16'-11"	8	7 1/2"	8'-0"	--	----	----	-----	4	12"	7'-10"	32	20
7	8	13"	13"	8"	6	6'-0"	6	6'-0"	6	6'-0"	5	7"	8'-0"	5'-9"	18'-11"	7	7"	8'-0"	--	----	----	-----	6	12"	9'-10"	32	28
7	10	13"	13"	9"	6	6'-0"	6	6'-0"	8	8'-0"	5	5 1/2"	8'-2"	6'-9"	21'-1"	6	5 1/2"	8'-1"	--	----	----	-----	5	5 1/2"	11'-10"	32	36
8	4	13 3/4"	13 3/4"	8"	7	7'-0"	7	7'-0"	2	2'-0"	5	8"	9'-0"	3'-10"	16'-0"	8	8"	9'-0"	3	8"	3'-2"	6' - 1"	4	8"	5'-11"	36	12
8	6	13 3/4"	13 3/4"	8"	7	7'-0"	7	7'-0"	4	4'-0"	4	8"	9'-0"	4'-8"	17'-10"	8	8"	9'-0"	3	8"	3'-3"	6' - 2"	4	12"	7'-11"	36	20
8	8	13 3/4"	13 3/4"	8"	7	7'-0"	7	7'-0"	6	6'-0"	5	6"	9'-0"	5'-10"	20'-0"	7	6"	9'-0"	--	----	----	-----	6	12"	9'-11"	36	28
8	10	13 1/2"	13 1/2"	9 1/2"	7	7'-0"	7	7'-0"	8	8'-0"	5	6"	9'-3"	6'-10"	22'-3"	7	6"	9'-3"	--	----	----	-----	5	6"	11'-11"	36	36
9	4	15 1/4"	15 1/4"	8"	8	8'-0"	8	8'-0"	2	2'-0"	4	7 1/2"	10'-0"	3'-10"	17'-1"	8	7 1/2"	10'-0"	4	7 1/2"	3'-4"	6' - 5"	4	7 1/2"	6'-2"	40	12
9	6	15 1/2"	15 1/2"	8"	8	8'-0"	8	8'-0"	4	4'-0"	4	7 1/2"	10'-0"	4'-10"	19'-1"	8	7 1/2"	10'-0"	3	7 1/2"	3'-4"	6' - 6"	4	12"	8'-3"	40	20
9	8	15 1/2"	15 1/2"	8"	8	8'-0"	8	8'-0"	6	6'-0"	4	7 1/2"	10'-0"	5'-10"	21'-1"	8	7 1/2"	10'-0"	4	7 1/2"	3'-9"	7' - 3"	6	12"	10'-2"	40	28
9	10	15 1/2"	15 1/2"	9"	8	8'-0"	8	8'-0"	8	8'-0"	5	5 1/2"	10'-0"	7'-0"	23'-6"	7	5 1/2"	10'-1"	--	----	----	-----	5	6"	12'-2"	40	36
9	12	15 1/4"	15 1/4"	11"	8	8'-0"	8	8'-0"	10	10'-0"	6	5 1/2"	10'-6"	8'-2"	25'-11"	7	5 1/2"	10'-6"	--	----	----	-----	7	9"	14'-2"	40	44
10	4	17"	17"	8"	9	9'-0"	9	9'-0"	2	2'-0"	5	5 1/2"	11'-0"	4'-2"	18'-7"	7	5 1/2"	11'-0"	--	----	----	-----	4	7 1/2"	6'-6"	44	12
10	6	17 1/4"	17 1/4"	8"	9	9'-0"	9	9'-0"	4	4'-0"	5	7"	11'-0"	5'-2"	20'-7"	8	7"	11'-0"	--	----	----	-----	4	12"	8'-6"	44	20
10	8	17 1/4"	17 1/4"	8"	9	9'-0"	9	9'-0"	6	6'-0"	5	7"	11'-0"	6'-2"	22'-7"	8	7"	11'-0"	--	----	----	-----	6	12"	10'-6"	44	28
10	10	17 1/4"	17 1/4"	9"	9	9'-0"	9	9'-0"	8	8'-0"	6	6 1/2"	11'-2"	7'-4"	24'-11"	8	6 1/2"	11'-1"	--	----	----	-----	5	6"	12'-6"	44	36
10	12	17"	17"	11"	9	9'-0"	9	9'-0"	10	10'-0"	6	6"	11'-6"	8'-3"	27'-3"	8	6"	11'-1"	--	----	----	-----	7	9 1/2"	14'-5"	44	44
12	6	19 1/2"	19 1/2"	8"	11	11'-0"	11	11'-0"	4	4'-0"	4	5 1/2"	13'-0"	5'-2"	22'-9"	8	5 1/2"	13'-0"	--	----	----	-----	4	12"	8'-11"	52	20
12	8	20"	20"	8"	11	11'-0"	11	11'-0"	6	6'-0"	5	6"	13'-0"	6'-4"	25'-1"	8	6"	13'-0"	--	----	----	-----	5	12"	11'-0"	52	28
12	10	20 1/4"	20 1/4"	8 1/2"	11	11'-0"	11	11'-0"	8	8'-0"	6	5 1/2"	13'-0"	7'-7"	27'-4"	8	5 1/2"	13'-0"	--	----	----	-----	6	9 1/2"	13'-0"	52	36
12	12	20 1/4"	20 1/4"	11"	11	11'-0"	11	11'-0"	10	10'-0"	6	5 1/2"	13'-6"	8'-7"	29'-9"	8	5 1/2"	13'-6"	--	----	----	-----	7	9 1/2"	15'-0"	52	44

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.11	07/11

SINGLE BOX CULVERTS
20 TO 30 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

SPAN (FT.)	HIGHT (FT.)	REINFORCING STEEL (LBS./LONG. JT)	QUAN./LF		HEADWALLS							
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)
				HEADWALL LENGTH	SIZE	LENGTH						
3	3	16.184	0.401	41.355	5'-10"	6	5'-6"	1.038	33.044	1.042	33.044	A
3	4	17.596	0.450	46.606	5'-10"	6	5'-6"	1.131	33.044	1.134	33.044	C
4	3	19.524	0.448	69.319	6'-10"	6	6'-6"	1.139	39.052	1.146	39.052	A
4	4	20.936	0.497	69.842	6'-10"	6	6'-6"	1.232	39.052	1.239	39.052	C
4	5	22.348	0.546	77.408	6'-10"	6	6'-6"	1.324	39.052	1.332	39.052	E
4	6	23.760	0.595	87.946	6'-10"	6	6'-6"	1.417	39.052	1.424	39.052	G
5	3	22.864	0.555	85.770	7'-10"	6	7'-6"	1.259	45.060	1.269	45.060	B
5	4	24.276	0.614	81.559	7'-10"	6	7'-6"	1.352	45.060	1.362	45.060	D
5	5	25.688	0.663	86.403	7'-10"	6	7'-6"	1.444	45.060	1.455	45.060	F
5	6	27.100	0.712	96.716	7'-10"	6	7'-6"	1.537	45.060	1.547	45.060	H
5	7	28.512	0.760	109.922	7'-10"	6	7'-6"	1.630	45.060	1.640	45.060	J
6	4	27.616	0.752	100.722	8'-10"	6	8'-6"	1.442	51.068	1.456	51.068	D
6	5	29.028	0.801	111.159	8'-10"	6	8'-6"	1.535	51.068	1.548	51.068	F
6	6	30.440	0.850	116.466	8'-10"	6	8'-6"	1.627	51.068	1.641	51.068	H
6	7	31.852	0.898	128.210	8'-10"	6	8'-6"	1.720	51.068	1.734	51.068	J
6	8	33.264	0.946	147.176	8'-10"	6	8'-6"	1.813	51.068	1.827	51.068	L
7	4	30.956	0.898	125.975	9'-10"	6	9'-6"	1.523	57.076	1.540	57.076	D
7	6	33.780	0.994	167.916	9'-10"	6	9'-6"	1.708	57.076	1.726	57.076	H
7	8	36.604	1.091	188.876	9'-10"	6	9'-6"	1.894	57.076	1.911	57.076	L
7	10	39.428	1.261	241.896	9'-10"	6	9'-6"	2.079	57.076	2.096	57.076	P
8	4	34.296	1.017	180.750	10'-10"	6	10'-6"	1.602	63.084	1.622	63.084	D
8	6	37.120	1.117	168.456	10'-10"	6	10'-6"	1.787	63.084	1.808	63.084	H
8	8	39.944	1.212	226.032	10'-10"	6	10'-6"	1.973	63.084	1.993	63.084	L
8	10	42.768	1.407	260.099	10'-10"	6	10'-6"	2.160	63.084	2.181	63.084	P
9	4	37.636	1.197	198.733	11'-10"	6	11'-6"	1.685	69.092	1.709	69.092	E
9	6	40.460	1.312	192.297	11'-10"	6	11'-6"	1.868	69.092	1.891	69.092	I
9	8	43.284	1.407	234.542	11'-10"	6	11'-6"	2.053	69.092	2.077	69.092	M
9	10	46.108	1.579	293.978	11'-10"	6	11'-6"	2.239	69.092	2.262	69.092	Q
9	12	48.932	1.846	389.542	11'-10"	6	11'-6"	2.383	69.092	2.406	69.092	U
10	4	40.976	1.410	236.138	12'-10"	6	12'-6"	1.737	75.100	1.764	75.100	E
10	6	43.800	1.527	228.503	12'-10"	6	12'-6"	1.919	75.100	1.946	75.100	I
10	8	46.624	1.624	258.918	12'-10"	6	12'-6"	2.104	75.100	2.131	75.100	M
10	10	49.448	1.795	349.512	12'-10"	6	12'-6"	2.290	75.100	2.317	75.100	Q
10	12	52.272	2.066	413.087	12'-10"	6	12'-6"	2.411	75.100	2.437	75.100	U
12	6	50.480	1.921	279.204	14'-10"	6	14'-6"	2.015	87.116	2.049	87.116	I
12	8	53.304	2.058	318.713	14'-10"	6	14'-6"	2.190	87.116	2.224	87.116	M
12	10	56.128	2.210	436.661	14'-10"	6	14'-6"	2.370	87.116	2.404	87.116	Q
12	12	58.952	2.548	488.548	14'-10"	6	14'-6"	2.485	87.116	2.518	87.116	U


A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

SPECIFICATION REFERENCE	<h2 style="margin: 0;">SINGLE BOX CULVERTS</h2> <h3 style="margin: 0;">20 TO 30 FT. FILLS</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE 07/11	SHEET 2 OF 2 1002.12

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

DIMENSIONS					REINFORCING STEEL																						
SPAN	HGHT	T1	T2	T3	BH1					BH2			BH3			BV1			NO. #1 BARS	NO. #3 BARS							
(FT.)	(FT.)	TOP SLAB (IN.)	BOTTOM SLAB (IN.)	WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH			SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	9"	4'-0"	2'-8"	8'-10"	5	9"	4'-0"	3	9"	2'-2"	4'-1"	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	9"	4'-0"	3'-2"	9'-10"	5	9"	4'-0"	--	---	----	----	4	12"	5'-0"	16	12
4	3	9 1/4"	9 1/4"	8"	3	3'-0"	3	3'-0"	1	1'-0"	4	9"	5'-0"	2'-10"	10'-1"	6	9"	5'-0"	--	---	----	----	4	12"	4'-2"	20	8
4	4	9"	9"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	8 1/2"	5'-0"	3'-3"	11'-0"	6	8 1/2"	5'-0"	--	---	----	----	4	12"	5'-2"	20	12
4	5	9"	9"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	8 1/2"	5'-0"	3'-9"	12'-0"	6	8 1/2"	5'-0"	--	---	----	----	4	12"	6'-2"	20	16
4	6	9 1/4"	9 1/4"	8"	3	3'-0"	3	3'-0"	4	4'-0"	4	8 1/2"	5'-0"	4'-4"	13'-1"	6	8 1/2"	5'-0"	--	---	----	----	6	12"	7'-2"	20	20
5	3	11 3/4"	11 3/4"	8"	4	4'-0"	4	4'-0"	1	1'-0"	4	7 1/2"	6'-0"	3'-0"	11'-6"	6	7 1/2"	6'-0"	--	---	----	----	4	11 1/2"	4'-7"	24	8
5	4	11 3/4"	11 3/4"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	7"	6'-0"	3'-6"	12'-6"	6	7"	6'-0"	--	---	----	----	4	12"	5'-7"	24	12
5	5	12"	12"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	7"	6'-0"	4'-0"	13'-6"	6	7"	6'-0"	--	---	----	----	4	12"	6'-8"	24	16
5	6	12"	12"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	7"	6'-0"	4'-6"	14'-6"	6	7"	6'-0"	--	---	----	----	5	12"	7'-8"	24	20
5	7	11 1/4"	11 1/4"	8"	4	4'-0"	4	4'-0"	5	5'-0"	4	7"	6'-0"	5'-0"	15'-5"	6	7"	6'-0"	--	---	----	----	6	10 1/2"	8'-6"	24	24
6	4	13"	13"	8"	5	5'-0"	5	5'-0"	2	2'-0"	4	6"	7'-0"	3'-7"	13'-8"	6	6"	7'-0"	--	---	----	----	4	12"	5'-10"	28	12
6	5	13"	13"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	6"	7'-0"	4'-1"	14'-8"	6	6"	7'-0"	--	---	----	----	4	12"	6'-10"	28	16
6	6	13"	13"	8"	5	5'-0"	5	5'-0"	4	4'-0"	4	6"	7'-0"	4'-7"	15'-8"	6	6"	7'-0"	--	---	----	----	5	12"	7'-10"	28	20
6	7	13"	13"	8"	5	5'-0"	5	5'-0"	5	5'-0"	4	6"	7'-0"	5'-2"	16'-8"	6	6"	7'-0"	--	---	----	----	6	12"	8'-10"	28	24
6	8	13"	13"	8 1/2"	5	5'-0"	5	5'-0"	6	6'-0"	4	6"	7'-1"	5'-8"	17'-9"	6	6"	7'-1"	--	---	----	----	6	10 1/2"	9'-10"	28	28
7	4	14 3/4"	14 3/4"	8"	6	6'-0"	6	6'-0"	2	2'-0"	4	5"	8'-0"	3'-9"	15'-0"	6	5"	8'-0"	--	---	----	----	4	12"	6'-1"	32	12
7	6	14 3/4"	14 3/4"	8"	6	6'-0"	6	6'-0"	4	4'-0"	4	5"	8'-0"	4'-9"	17'-0"	6	5"	8'-0"	--	---	----	----	5	12"	8'-1"	32	20
7	8	14 3/4"	14 3/4"	8"	6	6'-0"	6	6'-0"	6	6'-0"	4	5"	8'-0"	5'-9"	19'-0"	6	5"	8'-0"	--	---	----	----	5	7 1/2"	10'-1"	32	28
7	10	14 1/2"	14 1/2"	10 1/2"	6	6'-0"	6	6'-0"	8	8'-0"	6	8"	8'-5"	7'-1"	21'-9"	8	8"	8'-4"	--	---	----	----	6	7"	12'-1"	32	36
8	4	17"	17"	8"	7	7'-0"	7	7'-0"	2	2'-0"	4	6"	9'-0"	3'-11"	16'-4"	7	6"	9'-0"	--	---	----	----	4	12"	6'-6"	36	12
8	6	17 1/4"	17 1/4"	8"	7	7'-0"	7	7'-0"	4	4'-0"	4	6"	9'-0"	5'-0"	18'-5"	7	6"	9'-0"	--	---	----	----	5	12"	8'-6"	36	20
8	8	17 1/4"	17 1/4"	8"	7	7'-0"	7	7'-0"	6	6'-0"	5	6"	9'-0"	6'-2"	20'-7"	7	6"	9'-0"	--	---	----	----	5	7"	10'-6"	36	28
8	10	17"	17"	10 1/2"	7	7'-0"	7	7'-0"	8	8'-0"	6	7 1/2"	9'-5"	7'-3"	23'-2"	8	7 1/2"	9'-4"	--	---	----	----	6	7"	12'-5"	36	36
9	4	18 3/4"	18 3/4"	8"	8	8'-0"	8	8'-0"	2	2'-0"	4	5 1/2"	10'-0"	4'-1"	17'-8"	7	5 1/2"	10'-0"	--	---	----	----	4	12"	6'-9"	40	12
9	6	18 3/4"	18 3/4"	8"	8	8'-0"	8	8'-0"	4	4'-0"	4	5 1/2"	10'-0"	5'-1"	19'-8"	7	5 1/2"	10'-0"	--	---	----	----	4	12"	8'-9"	40	20
9	8	18 3/4"	18 3/4"	8"	8	8'-0"	8	8'-0"	6	6'-0"	4	5 1/2"	10'-0"	6'-1"	21'-8"	7	5 1/2"	10'-0"	--	---	----	----	5	7 1/2"	10'-9"	40	28
9	10	18 1/2"	18 1/2"	10"	8	8'-0"	8	8'-0"	8	8'-0"	6	7"	10'-4"	7'-5"	24'-4"	8	7"	10'-3"	--	---	----	----	5	4 1/2"	12'-8"	40	36
9	12	18 1/2"	18 1/2"	12 1/2"	8	8'-0"	8	8'-0"	10	10'-0"	7	7"	10'-9"	8'-8"	27'-1"	8	7"	10'-9"	--	---	----	----	6	6"	14'-8"	40	44
10	4	20"	20"	8"	9	9'-0"	9	9'-0"	2	2'-0"	5	6 1/2"	11'-0"	4'-5"	19'-1"	8	6 1/2"	11'-0"	--	---	----	----	4	11"	7'-0"	44	12
10	6	20 1/4"	20 1/4"	8"	9	9'-0"	9	9'-0"	4	4'-0"	5	6 1/2"	11'-0"	5'-5"	21'-1"	8	6 1/2"	11'-0"	--	---	----	----	4	12"	9'-0"	44	20
10	8	20 1/2"	20 1/2"	8"	9	9'-0"	9	9'-0"	6	6'-0"	5	6"	11'-0"	6'-5"	23'-2"	8	6"	11'-0"	--	---	----	----	5	7 1/2"	11'-1"	44	28
10	10	20 3/4"	20 3/4"	9 1/2"	9	9'-0"	9	9'-0"	8	8'-0"	6	6"	11'-3"	7'-7"	25'-7"	8	6"	11'-3"	--	---	----	----	5	4 1/2"	13'-1"	44	36
10	12	20 1/2"	20 1/2"	12 1/2"	9	9'-0"	9	9'-0"	10	10'-0"	6	5 1/2"	11'-9"	8'-7"	28'-1"	8	5 1/2"	11'-9"	--	---	----	----	6	6"	15'-1"	44	44
12	6	23 3/4"	23 3/4"	8"	11	11'-0"	11	11'-0"	4	4'-0"	5	5 1/2"	13'-0"	5'-8"	23'-7"	8	5 1/2"	13'-0"	--	---	----	----	4	9 1/2"	9'-6"	52	20
12	8	23 3/4"	23 3/4"	8"	11	11'-0"	11	11'-0"	6	6'-0"	5	5 1/2"	13'-0"	6'-8"	25'-7"	8	5 1/2"	13'-0"	--	---	----	----	5	8"	11'-6"	52	28
12	10	23"	23"	9 1/2"	11	11'-0"	11	11'-0"	8	8'-0"	5	5"	13'-3"	7'-7"	27'-10"	8	5"	13'-3"	--	---	----	----	5	5"	13'-5"	52	36
12	12	22 3/4"	22 3/4"	12"	11	11'-0"	11	11'-0"	10	10'-0"	6	5"	13'-8"	8'-10"	30'-6"	8	5"	13'-7"	--	---	----	----	7	9 1/2"	15'-7"	52	44

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 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.13	07/11

SINGLE BOX CULVERTS
30 TO 40 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS./LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH						
3	3	16.184	0.400	55.206	5'-10"	6	5'-6"	1.038	33.044	1.042	33.044	A	
3	4	17.596	0.449	51.804	5'-10"	6	5'-6"	1.131	33.044	1.134	33.044	C	
4	3	19.524	0.490	61.854	6'-10"	6	6'-6"	1.161	39.052	1.169	39.052	B	
4	4	20.936	0.530	68.673	6'-10"	6	6'-6"	1.235	39.052	1.242	39.052	C	
4	5	22.348	0.579	73.399	6'-10"	6	6'-6"	1.328	39.052	1.335	39.052	E	
4	6	23.760	0.636	90.283	6'-10"	6	6'-6"	1.440	39.052	1.447	39.052	H	
5	3	22.864	0.643	81.426	7'-10"	6	7'-6"	1.259	45.060	1.269	45.060	B	
5	4	24.276	0.692	90.093	7'-10"	6	7'-6"	1.352	45.060	1.362	45.060	D	
5	5	25.688	0.750	95.374	7'-10"	6	7'-6"	1.444	45.060	1.455	45.060	F	
5	6	27.100	0.799	106.254	7'-10"	6	7'-6"	1.537	45.060	1.547	45.060	H	
5	7	28.512	0.818	123.095	7'-10"	6	7'-6"	1.630	45.060	1.640	45.060	J	
6	4	27.616	0.819	112.841	8'-10"	6	8'-6"	1.437	51.068	1.451	51.068	D	
6	5	29.028	0.868	118.353	8'-10"	6	8'-6"	1.530	51.068	1.544	51.068	F	
6	6	30.440	0.916	129.740	8'-10"	6	8'-6"	1.623	51.068	1.636	51.068	H	
6	7	31.852	0.965	144.111	8'-10"	6	8'-6"	1.715	51.068	1.729	51.068	J	
6	8	33.264	1.045	156.235	8'-10"	6	8'-6"	1.808	51.068	1.822	51.068	L	
7	4	30.956	0.987	143.621	9'-10"	6	9'-6"	1.512	57.076	1.529	57.076	D	
7	6	33.780	1.084	161.807	9'-10"	6	9'-6"	1.698	57.076	1.715	57.076	H	
7	8	36.604	1.181	188.072	9'-10"	6	9'-6"	1.883	57.076	1.900	57.076	L	
7	10	39.428	1.453	266.363	9'-10"	6	9'-6"	2.032	57.076	2.049	57.076	P	
8	4	34.296	1.206	159.065	10'-10"	6	10'-6"	1.590	63.084	1.611	63.084	E	
8	6	37.120	1.318	176.663	10'-10"	6	10'-6"	1.773	63.084	1.794	63.084	I	
8	8	39.944	1.412	236.248	10'-10"	6	10'-6"	1.959	63.084	1.979	63.084	M	
8	10	42.768	1.690	298.216	10'-10"	6	10'-6"	2.107	63.084	2.127	63.084	Q	
9	4	37.636	1.421	186.129	11'-10"	6	11'-6"	1.642	69.092	1.666	69.092	E	
9	6	40.460	1.519	197.639	11'-10"	6	11'-6"	1.828	69.092	1.851	69.092	I	
9	8	43.284	1.615	230.749	11'-10"	6	11'-6"	2.013	69.092	2.037	69.092	M	
9	10	46.108	1.851	336.193	11'-10"	6	11'-6"	2.162	69.092	2.185	69.092	Q	
9	12	48.932	2.201	425.353	11'-10"	6	11'-6"	2.202	69.092	2.224	69.092	U	
10	4	40.976	1.621	231.746	12'-10"	6	12'-6"	1.691	75.100	1.718	75.100	E	
10	6	43.800	1.736	244.494	12'-10"	6	12'-6"	1.872	75.100	1.899	75.100	I	
10	8	46.624	1.848	296.723	12'-10"	6	12'-6"	2.054	75.100	2.081	75.100	M	
10	10	49.448	2.081	395.781	12'-10"	6	12'-6"	2.194	75.100	2.221	75.100	Q	
10	12	52.272	2.461	463.231	12'-10"	6	12'-6"	2.236	75.100	2.262	75.100	U	
12	6	50.480	2.227	324.329	14'-10"	6	14'-6"	1.953	87.116	1.987	87.116	J	
12	8	53.304	2.323	356.451	14'-10"	6	14'-6"	2.138	87.116	2.172	87.116	N	
12	10	56.128	2.523	431.964	14'-10"	6	14'-6"	2.287	87.116	2.320	87.116	R	
12	12	58.952	2.942	534.328	14'-10"	6	14'-6"	2.327	87.116	2.359	87.116	V	


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SPECIFICATION REFERENCE	<h2 style="margin: 0;">SINGLE BOX CULVERTS</h2> <h3 style="margin: 0;">30 TO 40 FT. FILLS</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p style="margin: 0;">ROAD AND BRIDGE STANDARDS</p>	
		REVISION DATE	SHEET 2 OF 2
		07/11	1002.14

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCS-DT.

DIMENSIONS					REINFORCING STEEL																						
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB (IN.)	T2 BOTTOM SLAB (IN.)	T3 WALL (IN.)	A	B	C	D	E	F	BH1				BH2			BH3				BV1			NO. BL1 #4 BARS	NO. BL2 #3 BARS	
											SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C			LENGTH
3	3	8"	8"	8"	2	2'-0"	2	2'-0"	1	1'-0"	4	6"	4'-0"	2'-8"	8'-10"	6	10"	4'-0"	4	10"	2'-1 1/4"	3'-11"	4	12"	4'-0"	16	8
3	4	8"	8"	8"	2	2'-0"	2	2'-0"	2	2'-0"	4	6"	4'-0"	3'-2"	9'-10"	6	10"	4'-0"	4	10"	2'-1 1/4"	3'-11"	4	12"	5'-0"	16	12
4	3	10 1/4"	10 1/4"	8"	3	3'-0"	3	3'-0"	1	1'-0"	5	8 1/2"	5'-0"	2'-10 1/4"	10'-2"	6	8"	5'-0"	--	--	----	----	4	12"	4'-5"	20	8
4	4	10 1/4"	10 1/4"	8"	3	3'-0"	3	3'-0"	2	2'-0"	4	7"	5'-0"	3'-4"	11'-2"	6	7 1/2"	5'-0"	--	--	----	----	4	12"	5'-4"	20	12
4	5	10 1/4"	10 1/4"	8"	3	3'-0"	3	3'-0"	3	3'-0"	4	8"	5'-0"	3'-10 1/4"	12'-2"	6	8"	5'-0"	--	--	----	----	5	12"	6'-5"	20	16
4	6	10 1/4"	10 1/4"	10"	3	3'-0"	3	3'-0"	4	4'-0"	4	8"	5'-0"	4'-4 1/4"	13'-2"	6	8"	5'-0"	--	--	----	----	5	12"	7'-5"	20	20
5	3	13"	13"	8"	4	4'-0"	4	4'-0"	1	1'-0"	4	6 1/2"	6'-0"	3'-1"	11'-8"	6	6 1/2"	6'-0"	--	--	----	----	4	12"	4'-10"	24	8
5	4	13"	13"	8"	4	4'-0"	4	4'-0"	2	2'-0"	4	6 1/2"	6'-0"	3'-7"	12'-8"	6	6 1/2"	6'-0"	--	--	----	----	4	12"	5'-10"	24	12
5	5	13"	13"	8"	4	4'-0"	4	4'-0"	3	3'-0"	4	6 1/2"	6'-0"	4'-1"	13'-8"	6	6 1/2"	6'-0"	--	--	----	----	5	12"	6'-10"	24	16
5	6	12 1/4"	12 1/4"	8"	4	4'-0"	4	4'-0"	4	4'-0"	4	6"	6'-0"	4'-6 1/4"	14'-6"	6	6"	6'-0"	--	--	----	----	5	10"	7'-9"	24	20
5	7	12 1/4"	12 1/4"	10"	4	4'-0"	4	4'-0"	5	5'-0"	4	6 1/2"	6'-0"	5'-1 1/4"	15'-6"	6	6 1/2"	6'-0"	--	--	----	----	5	8"	8'-9"	24	24
6	4	14 1/2"	14 1/2"	8"	5	5'-0"	5	5'-0"	2	2'-0"	4	9"	7'-0"	3'-8 1/2"	13'-11"	8	9"	7'-0"	3	9"	2'-8 3/8"	5'-2"	4	12"	6'-1"	28	12
6	5	14 1/2"	14 1/2"	8"	5	5'-0"	5	5'-0"	3	3'-0"	4	5"	7'-0"	4'-2 1/2"	14'-11"	6	5"	7'-0"	--	--	----	----	4	12"	7'-1"	28	16
6	6	14 3/4"	14 3/4"	8 3/4"	5	5'-0"	5	5'-0"	4	4'-0"	5	9"	7'-0"	4'-8 3/4"	15'-11"	8	9"	7'-0"	3	9"	3'-3"	6'-4"	5	10"	8'-1"	28	20
6	7	14 3/4"	14 3/4"	8"	5	5'-0"	5	5'-0"	5	5'-0"	5	8 1/2"	7'-0"	5'-2 3/4"	16'-10"	8	8 1/2"	7'-0"	3	8 1/2"	3'-6"	6'-10"	5	6"	9'-1"	28	24
6	8	14 1/2"	14 1/2"	10"	5	5'-0"	5	5'-0"	6	6'-0"	5	8 1/2"	7'-0"	5'-8 1/2"	17'-9"	8	8 1/2"	7'-0"	3	8 1/2"	3'-8"	7'-2"	5	6"	10'-1"	28	28
7	4	17 1/2"	17 1/2"	8"	6	6'-0"	6	6'-0"	2	2'-0"	5	8"	8'-0"	3'-11 1/2"	15'-3"	8	8"	8'-0"	--	--	----	----	4	12"	6'-7"	32	12
7	6	17 3/4"	17 3/4"	8"	6	6'-0"	6	6'-0"	4	4'-0"	5	8"	8'-0"	4'-11 3/4"	17'-5"	8	8"	8'-0"	4	8"	2'-10 3/4"	5'-6"	5	10"	8'-7"	32	20
7	8	17 1/2"	17 1/2"	8 3/4"	6	6'-0"	6	6'-0"	6	6'-0"	5	8"	8'-0"	5'-11 1/2"	19'-3"	8	8"	8'-0"	3	8"	3'-11"	7'-7"	5	6"	10'-7"	32	28
7	10	17 1/2"	17 1/2"	12"	6	6'-0"	6	6'-0"	8	8'-0"	5	8"	8'-0"	6'-11 1/2"	21'-3"	8	8"	8'-0"	3	8"	4'-4"	8'-7"	7	9"	12'-7"	32	36
8	4	18 1/4"	18 1/4"	8"	7	7'-0"	7	7'-0"	2	2'-0"	5	5 1/2"	9'-0"	4'-1 1/4"	16'-6"	7	5 1/2"	9'-0"	--	--	----	----	4	12"	6'-9"	36	12
8	6	18 1/2"	18 1/2"	8"	7	7'-0"	7	7'-0"	4	4'-0"	4	5 1/2"	9'-0"	5'-1 1/2"	18'-7"	7	5 1/2"	9'-0"	--	--	----	----	5	12"	8'-9"	36	20
8	8	18 3/4"	18 3/4"	9"	7	7'-0"	7	7'-0"	6	6'-0"	5	5 1/2"	9'-0"	6'-3 1/4"	20'-6"	7	5 1/2"	9'-0"	--	--	----	----	5	5 1/2"	10'-9"	36	28
8	10	19"	19"	12"	7	7'-0"	7	7'-0"	8	8'-0"	5	5 1/2"	9'-3 1/2"	7'-1"	22'-10"	7	5 1/2"	9'-3"	--	--	----	----	5	6"	12'-10"	36	36
9	4	20"	20"	8"	8	8'-0"	8	8'-0"	2	2'-0"	5	6 1/2"	10'-0"	4'-2"	17'-8"	8	6 1/2"	10'-0"	--	--	----	----	4	12"	7'-0"	40	12
9	6	20 1/2"	20 1/2"	8"	8	8'-0"	8	8'-0"	4	4'-0"	5	6 1/2"	10'-0"	5'-2 1/2"	19'-9"	8	6 1/2"	10'-0"	--	--	----	----	5	12"	9'-1"	40	20
9	8	20 3/4"	20 3/4"	8 1/2"	8	8'-0"	8	8'-0"	6	6'-0"	5	6"	10'-0"	6'-2 3/4"	21'-10"	8	6"	10'-0"	--	--	----	----	6	8"	11'-1"	40	28
9	10	20 3/4"	20 3/4"	12"	8	8'-0"	8	8'-0"	8	8'-0"	6	6 1/2"	10'-3 1/2"	7'-6 1/4"	24'-7"	8	6 1/2"	10'-3"	--	--	----	----	5	6"	13'-1"	40	36
9	12	21"	21"	14"	8	8'-0"	8	8'-0"	10	10'-0"	6	5 1/2"	10'-6 1/2"	8'-6 1/2"	26'-10"	8	5 1/2"	10'-6"	--	--	----	----	7	8"	15'-2"	40	44
10	4	22 1/2"	22 1/2"	8"	9	9'-0"	9	9'-0"	2	2'-0"	5	6"	11'-0"	4'-4 1/2"	19'-3"	8	6"	11'-0"	--	--	----	----	4	12"	7'-5"	44	12
10	6	22 1/4"	22 1/4"	8"	9	9'-0"	9	9'-0"	4	4'-0"	5	6"	11'-0"	5'-4 1/4"	21'-2"	8	6"	11'-0"	--	--	----	----	5	12"	9'-4"	44	20
10	8	22 1/4"	22 1/4"	8"	9	9'-0"	9	9'-0"	6	6'-0"	5	6"	11'-0"	6'-4 1/4"	23'-1"	8	6"	11'-0"	--	--	----	----	5	5 1/2"	11'-4"	44	28
10	10	22"	22"	12"	9	9'-0"	9	9'-0"	8	8'-0"	5	5 1/2"	11'-3 1/2"	7'-4"	25'-4"	8	5 1/2"	11'-3"	--	--	----	----	5	5"	13'-4"	44	36
10	12	22"	22"	14"	9	9'-0"	9	9'-0"	10	10'-0"	7	5 1/2"	11'-6 1/2"	8'-11"	28'-5"	8	5 1/2"	11'-6"	--	--	----	----	6	6"	15'-4"	44	44
12	6	27 1/2"	27 1/2"	8 1/2"	11	11'-0"	11	11'-0"	4	4'-0"	4	5"	13'-1"	5'-9 1/2"	24'-2"	8	5"	13'-1"	--	--	----	----	5	12"	10'-3"	52	20
12	8	27 1/2"	27 1/2"	8"	11	11'-0"	11	11'-0"	6	6'-0"	5	5"	13'-0"	6'-11 1/2"	26'-3"	8	5"	13'-0"	--	--	----	----	6	7"	12'-3"	52	28
12	10	27 1/2"	27 1/2"	12"	11	11'-0"	11	11'-0"	8	8'-0"	5	4 1/2"	13'-3 1/2"	7'-11 1/2"	28'-7"	8	4 1/2"	13'-3"	--	--	----	----	7	9 1/2"	14'-3"	52	36
12	12	27 1/2"	27 1/2"	14"	11	11'-0"	11	11'-0"	10	10'-0"	6	4 1/2"	13'-6 1/2"	9'-1"	31'-0"	8	4 1/2"	13'-6"	--	--	----	----	7	8"	16'-3"	52	44

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 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1002.15	07/11

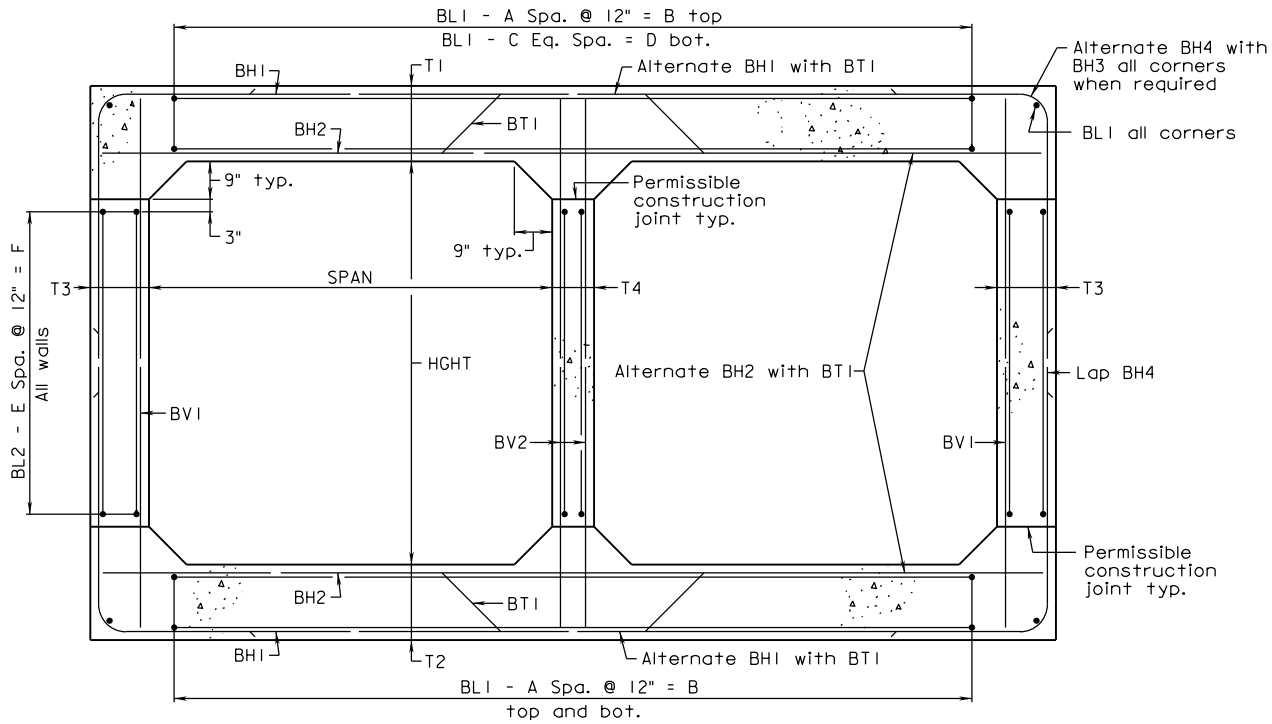
SINGLE BOX CULVERTS
40 TO 50 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

SPAN (FT.)	HGHT (FT.)	REINFORCING STEEL (LBS/LONG. JT)	QUAN./LF		HEADWALLS								
			CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		INLET CONCRETE CL. A4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
					HEADWALL LENGTH	SIZE	LENGTH	LENGTH					
3	3	16.184	0.399	68.962	5'-10"	6	5'- 6"	1.038	33.044	1.042	33.044	A	
3	4	17.596	0.448	74.625	5'-10"	6	5'- 6"	1.131	33.044	1.134	33.044	C	
4	3	19.524	0.522	76.100	6'-10"	6	6'- 6"	1.165	39.052	1.172	39.052	B	
4	4	20.936	0.571	75.683	6'-10"	6	6'- 6"	1.257	39.052	1.264	39.052	D	
4	5	22.348	0.620	81.181	6'-10"	6	6'- 6"	1.350	39.052	1.357	39.052	F	
4	6	23.760	0.764	86.910	6'-10"	6	6'- 6"	1.443	39.052	1.450	39.052	H	
5	3	22.864	0.691	87.548	7'-10"	6	7'- 6"	1.259	45.060	1.269	45.060	B	
5	4	24.276	0.740	92.854	7'-10"	6	7'- 6"	1.352	45.060	1.362	45.060	D	
5	5	25.688	0.789	104.834	7'-10"	6	7'- 6"	1.444	45.060	1.455	45.060	F	
5	6	27.100	0.808	119.650	7'-10"	6	7'- 6"	1.537	45.060	1.547	45.060	H	
5	7	28.512	0.968	126.150	7'-10"	6	7'- 6"	1.630	45.060	1.640	45.060	J	
6	4	27.616	0.887	116.334	8'-10"	6	8'- 6"	1.433	51.068	1.446	51.068	D	
6	5	29.028	0.935	132.479	8'-10"	6	8'- 6"	1.525	51.068	1.539	51.068	F	
6	6	30.440	1.038	155.252	8'-10"	6	8'- 6"	1.617	51.068	1.631	51.068	H	
6	7	31.852	1.041	186.084	8'-10"	6	8'- 6"	1.710	51.068	1.724	51.068	J	
6	8	33.264	1.207	195.354	8'-10"	6	8'- 6"	1.804	51.068	1.817	51.068	L	
7	4	30.956	1.128	146.481	9'-10"	6	9'- 6"	1.514	57.076	1.531	57.076	E	
7	6	33.780	1.236	194.910	9'-10"	6	9'- 6"	1.698	57.076	1.715	57.076	I	
7	8	36.604	1.371	222.064	9'-10"	6	9'- 6"	1.885	57.076	1.902	57.076	M	
7	10	39.428	1.735	257.787	9'-10"	6	9'- 6"	2.070	57.076	2.087	57.076	Q	
8	4	34.296	1.276	195.772	10'-10"	6	10'- 6"	1.579	63.084	1.599	63.084	E	
8	6	37.120	1.390	187.491	10'-10"	6	10'- 6"	1.762	63.084	1.782	63.084	I	
8	8	39.944	1.566	261.160	10'-10"	6	10'- 6"	1.945	63.084	1.965	63.084	M	
8	10	42.768	1.934	281.746	10'-10"	6	10'- 6"	1.987	63.084	2.006	63.084	Q	
9	4	37.636	1.499	207.204	11'-10"	6	11'- 6"	1.627	69.092	1.650	69.092	E	
9	6	40.460	1.628	231.090	11'-10"	6	11'- 6"	1.806	69.092	1.830	69.092	I	
9	8	43.284	1.774	288.545	11'-10"	6	11'- 6"	1.988	69.092	2.012	69.092	M	
9	10	46.108	2.166	334.834	11'-10"	6	11'- 6"	2.030	69.092	2.052	69.092	Q	
9	12	48.932	2.515	436.543	11'-10"	6	11'- 6"	2.048	69.092	2.069	69.092	U	
10	4	40.976	1.795	245.200	12'-10"	6	12'- 6"	1.671	75.100	1.698	75.100	F	
10	6	43.800	1.874	266.040	12'-10"	6	12'- 6"	1.860	75.100	1.887	75.100	J	
10	8	46.624	1.970	310.043	12'-10"	6	12'- 6"	2.046	75.100	2.073	75.100	N	
10	10	49.448	2.385	361.147	12'-10"	6	12'- 6"	2.089	75.100	2.114	75.100	R	
10	12	52.272	2.714	528.019	12'-10"	6	12'- 6"	2.109	75.100	2.133	75.100	V	
12	6	50.480	2.610	314.113	14'-10"	6	14'- 6"	1.847	87.116	1.881	87.116	K	
12	8	53.304	2.668	410.348	14'-10"	6	14'- 6"	2.065	87.116	2.099	87.116	O	
12	10	56.128	3.123	476.112	14'-10"	6	14'- 6"	2.094	87.116	2.127	87.116	S	
12	12	58.952	3.467	594.069	14'-10"	6	14'- 6"	2.106	87.116	2.137	87.116	W	

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SPECIFICATION REFERENCE	<h2 style="margin: 0;">SINGLE BOX CULVERTS</h2> <h3 style="margin: 0;">40 TO 50 FT. FILLS</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE	SHEET 2 OF 2
		07/11	1002.16



TYPICAL SECTION

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ROAD AND BRIDGE STANDARDS

SHEET 1 OF 3

REVISION DATE

1003.01

07/11

DOUBLE BOX CULVERTS STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

GENERAL NOTE

Capacity: AASHTO HI-93 Loading.

Specifications:

Construction - Va. Department of Transportation Road and Bridge Specifications 2007.

Design - AASHTO LRFD Bridge Design Specifications, 4th Edition 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 and BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 size unless otherwise shown. BL2 shall be #3 size.

The number of BL1 and BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 and BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 and BL2 bars. The additional weight per longitudinal lap is shown in the table.

The minimum cover of main reinforcing bars shall be 2 1/2" from the face of the concrete for culverts under 0 to 2 foot fills and shall be 2" from the face of concrete for all other culverts.

All reinforcing steel for culverts under 0 to 2 foot fills shall be Low Carbon/Chromium Reinforcing Steel conforming to ASTM A1035.

At the Contractor's option, BV1 and BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

For modification of details for skewed culverts, see the skewed box details included in the road plans.

This standard shall be used with the BCD standard series.

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SPECIFICATION
REFERENCE

DOUBLE BOX CULVERTS STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

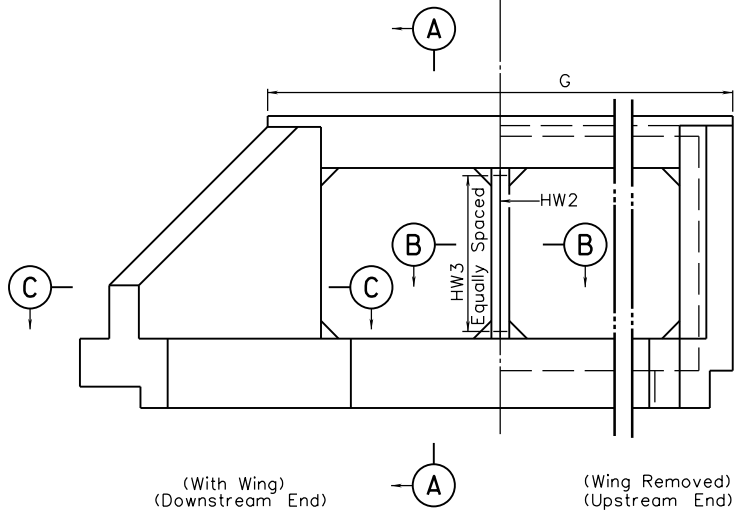
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SHEET 2 OF 3

07/11

1003.02

Symmetrical about \varnothing Culvert



(With Wing)
(Downstream End)

(Wing Removed)
(Upstream End)

END ELEVATION

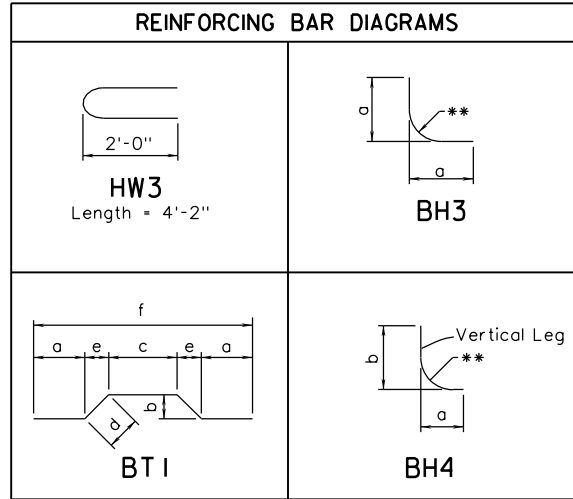
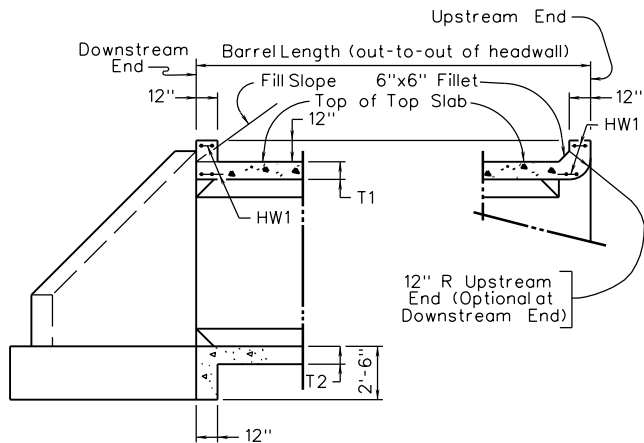
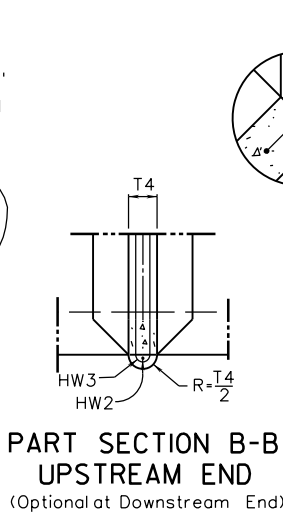


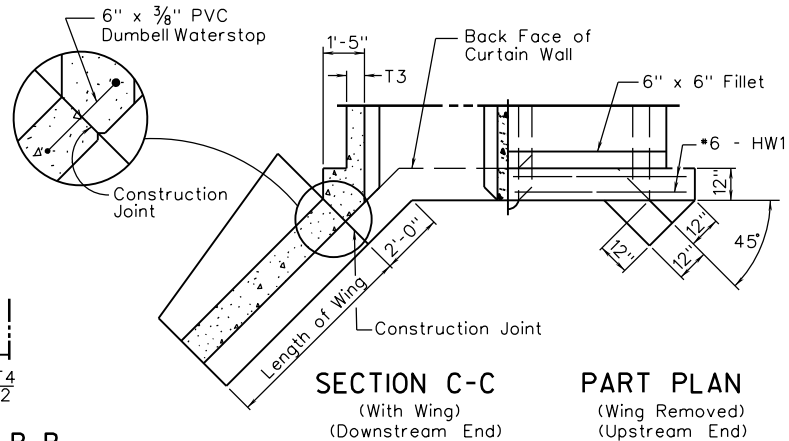
TABLE A	
Bar Size	Pin Dia.
#3	2 1/4"
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"
#9	9"



SECTION A-A
(With Wing)



PART SECTION B-B
UPSTREAM END
(Optional at Downstream End)



SECTION C-C
(With Wing)
(Downstream End)

PART PLAN
(Wing Removed)
(Upstream End)



ROAD AND BRIDGE STANDARDS

SHEET 3 OF 3

REVISION DATE

1003.03

07/11

**DOUBLE BOX CULVERTS
STANDARD DETAILS**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

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SPECIFICATION
REFERENCE

DOUBLE BOX CULVERTS
STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



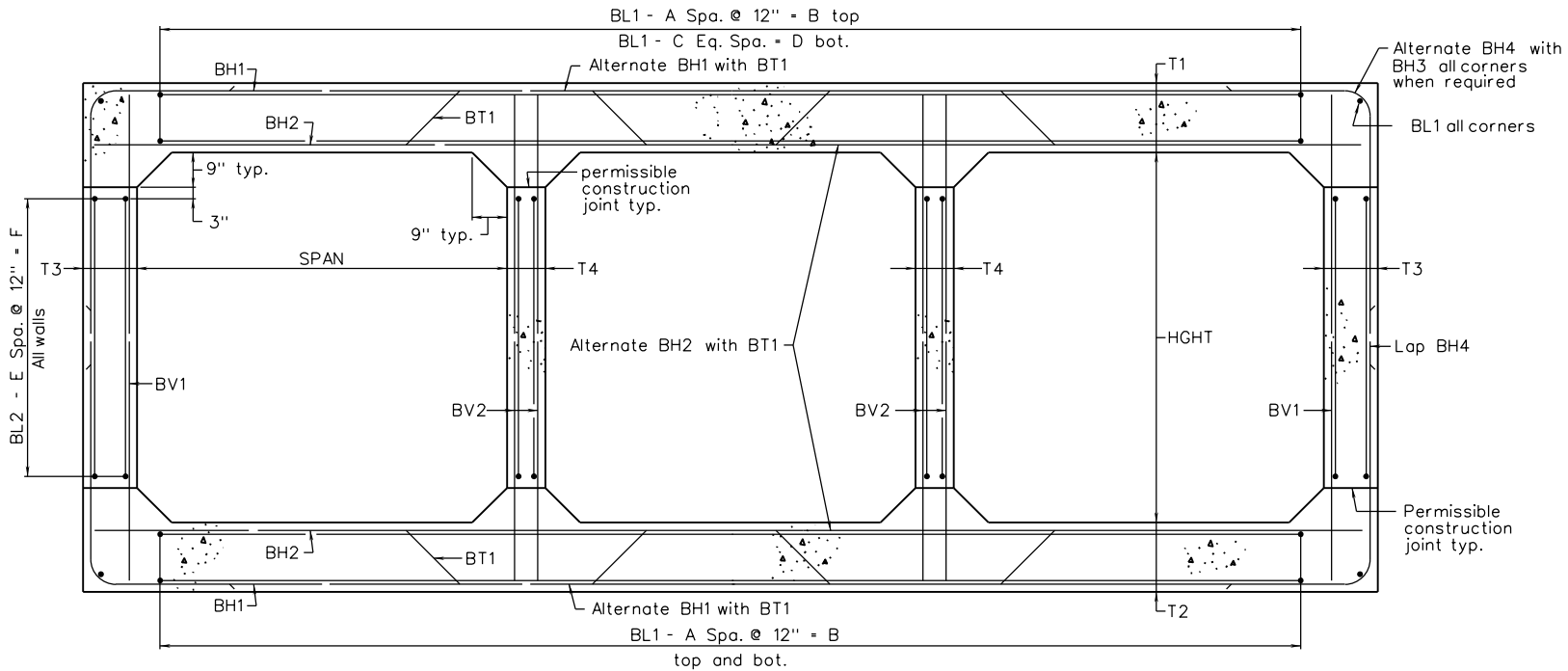
ROAD AND BRIDGE STANDARDS

REVISION DATE

07/11

SHEET 1 OF 1

1003.04



TYPICAL SECTION

A copy of the original sealed and signed drawing is on file in the central office.



ROAD AND BRIDGE STANDARDS

TRIPLE BOX CULVERTS
STANDARD DETAILS

SPECIFICATION
REFERENCE

SHEET 1 OF 3

REVISION DATE

1004.01

07/11

VIRGINIA DEPARTMENT OF TRANSPORTATION

GENERAL NOTE

Capacity: AASHTO HI-93 Loading.

Specifications:

Construction - Virginia Department of Transportation Road and Bridge Specifications 2007.

Design - AASHTO LRFD Bridge Design Specifications, 4th Edition 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 and BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 size unless otherwise shown. BL2 shall be #3 size.

The number of BL1 and BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 and BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 and BL2 bars. The additional weight per longitudinal lap is shown in the table.

The minimum cover of main reinforcing bars shall be 2 1/2" from the face of the concrete for culverts under 0 to 2 foot fills and shall be 2" from the face of concrete for all other culverts.

All reinforcing steel for culverts under 0 to 2 foot fills shall be Low Carbon/Chromium Reinforcing Steel conforming to ASTM A1035.

At the Contractor's option, BV1 and BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

For modification of details for skewed culverts, see the skewed box details included in the road plans.

This standard shall be used with the BCT standard series.

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION
REFERENCE

TRIPLE BOX CULVERTS STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 2 OF 3

07/11

1004.02

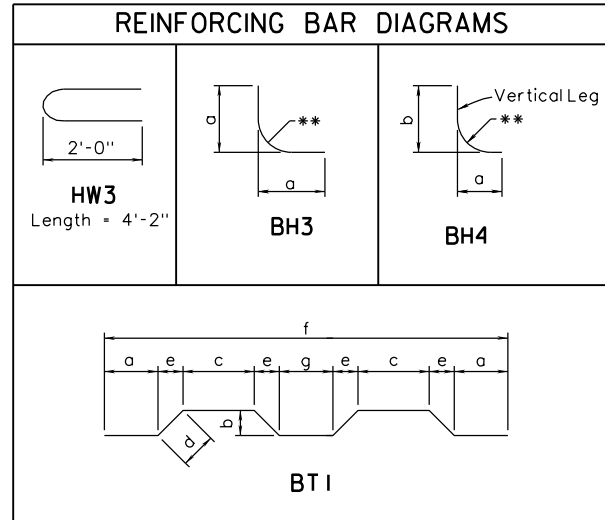
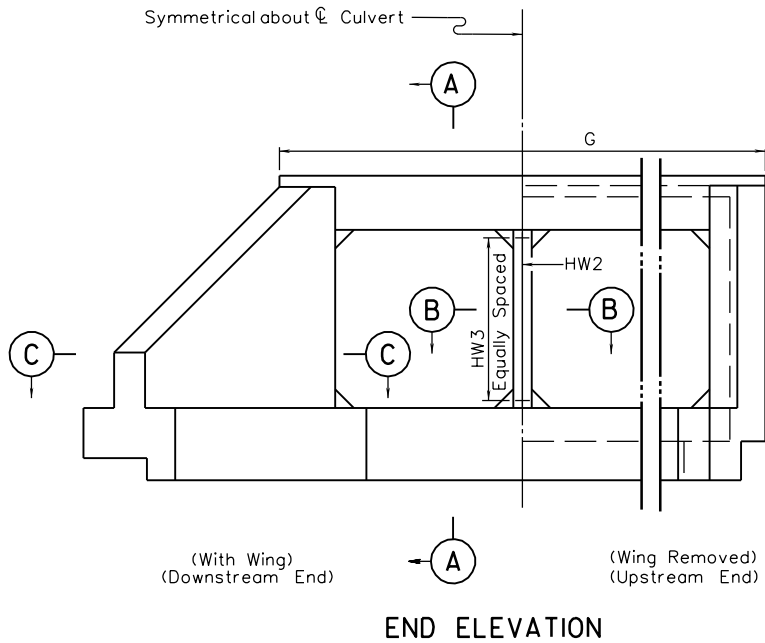
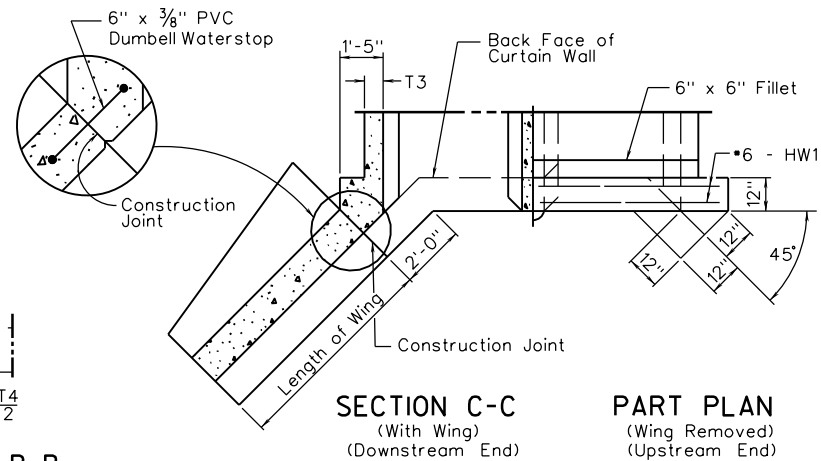
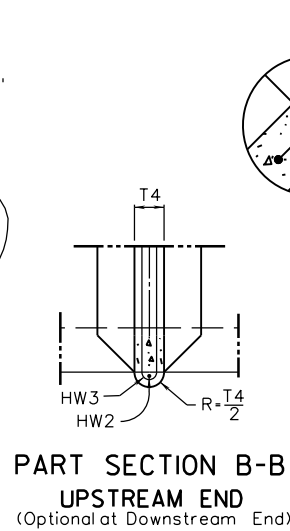
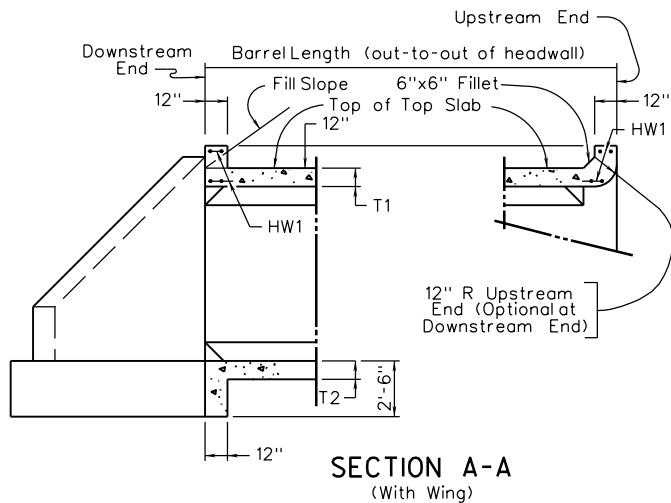


TABLE A	
Bar Size	Pin Dia.
#3	2 1/4"
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"
#9	9"



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SPECIFICATION
REFERENCE

TRIPLE BOX CULVERTS
STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 1

07/11

1004.04

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCT-DT.

BCT-10

SPAN		HGHT		REINFORCING STEEL											QUAN./LF		HEADWALLS							WINGWALL			
(FT.)	(FT.)	SIZE	SPACING C-C	BT I											CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. A4 (CY)		INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)
				a	b	c	d	e	f	g	LENGTH	NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS/LONG. JT)			HEADWALL LENGTH	SIZE	LENGTH								
3	3	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	11'- 3 7/8"	1'- 5 7/8"	11'- 10"	44	16	42.388	0.989	109.333	13'- 2"	6	12'- 10"	2	8	1.827	102.932	1.808	77.103	A	
3	4	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	11'- 3 7/8"	1'- 5 7/8"	11'- 10"	44	24	45.212	1.087	117.685	13'- 2"	6	12'- 10"	2	10	1.932	109.835	1.901	77.103	C	
4	3	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	14'- 4"	2'- 1"	14'- 10"	56	16	52.408	1.136	129.262	16'- 2"	6	15'- 10"	2	8	2.131	120.956	2.121	95.127	A	
4	4	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	14'- 4"	2'- 1"	14'- 10"	56	24	55.232	1.234	137.614	16'- 2"	6	15'- 10"	2	10	2.236	127.859	2.214	95.127	C	
4	5	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	14'- 4"	2'- 1"	14'- 10"	56	32	58.056	1.332	145.966	16'- 2"	6	15'- 10"	2	12	2.341	134.761	2.307	95.127	E	
4	6	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	14'- 4"	2'- 1"	14'- 10"	56	40	60.880	1.430	154.318	16'- 2"	6	15'- 10"	2	14	2.446	141.664	2.399	95.127	G	
5	3	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	17'- 4"	2'- 8 1/4"	17'- 10"	68	16	62.428	1.282	149.413	19'- 2"	6	18'- 10"	2	8	2.434	138.980	2.435	113.151	A	
5	4	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	17'- 4"	2'- 8 1/4"	17'- 10"	68	24	65.252	1.381	157.765	19'- 2"	6	18'- 10"	2	10	2.539	145.883	2.527	113.151	C	
5	5	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	17'- 4"	2'- 8 1/4"	17'- 10"	68	32	68.076	1.479	166.117	19'- 2"	6	18'- 10"	2	12	2.644	152.785	2.620	113.151	E	
5	6	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	17'- 4"	2'- 8 1/4"	17'- 10"	68	40	70.900	1.577	174.469	19'- 2"	6	18'- 10"	2	14	2.750	159.688	2.713	113.151	G	
5	7	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	17'- 4"	2'- 8 1/4"	17'- 10"	68	48	73.724	1.675	182.821	19'- 2"	6	18'- 10"	2	16	2.855	166.591	2.806	113.151	I	
6	4	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	20'- 4"	3'- 3 1/2"	20'- 10"	80	24	75.272	1.526	191.180	22'- 2"	6	21'- 10"	2	10	2.843	163.907	2.841	131.175	C	
6	5	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	20'- 4"	3'- 3 1/2"	20'- 10"	80	32	78.096	1.625	192.048	22'- 2"	6	21'- 10"	2	12	2.948	170.809	2.934	131.175	E	
6	6	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	20'- 4"	3'- 3 1/2"	20'- 10"	80	40	80.920	1.723	200.651	22'- 2"	6	21'- 10"	2	14	3.053	177.712	3.026	131.175	G	
6	7	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	20'- 4"	3'- 3 1/2"	20'- 10"	80	48	83.744	1.821	209.118	22'- 2"	6	21'- 10"	2	16	3.158	184.615	3.119	131.175	I	
6	8	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	20'- 4"	3'- 3 1/2"	20'- 10"	80	56	86.568	1.919	227.090	22'- 2"	6	21'- 10"	2	18	3.263	191.517	3.212	131.175	K	
7	4	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	23'- 4 1/8"	3'- 10 5/8"	23'- 10"	92	24	85.292	1.673	213.514	25'- 2"	6	24'- 10"	2	10	3.146	181.931	3.154	149.199	C	
7	6	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	23'- 4 1/8"	3'- 10 5/8"	23'- 10"	92	40	90.940	1.868	236.972	25'- 2"	6	24'- 10"	2	14	3.357	195.736	3.340	149.199	G	
7	8	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	23'- 4 1/8"	3'- 10 5/8"	23'- 10"	92	56	96.588	2.065	255.994	25'- 2"	6	24'- 10"	2	18	3.567	209.541	3.525	149.199	K	
7	10	4	11"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	23'- 4 1/8"	3'- 10 5/8"	23'- 10"	92	72	102.236	2.259	295.024	25'- 2"	6	24'- 10"	2	22	3.777	223.347	3.711	149.199	O	
8	4	4	11"	6'- 8 7/8"	0'- 4 1/2"	3'- 6 3/8"	0'- 5 7/8"	0'- 3 3/4"	26'- 3 7/8"	4'- 5 7/8"	26'- 10"	104	24	95.312	1.817	260.455	28'- 2"	6	27'- 10"	2	10	3.450	199.955	3.468	167.223	C	
8	6	4	10"	6'- 8 3/4"	0'- 4 3/4"	3'- 6 3/8"	0'- 6 1/4"	0'- 4"	26'- 3 7/8"	4'- 5 7/8"	26'- 11"	104	40	100.960	2.054	280.389	28'- 2"	6	27'- 10"	2	14	3.644	213.760	3.638	167.223	G	
8	8	4	10"	6'- 8 5/8"	0'- 5"	3'- 6 1/8"	0'- 6 1/2"	0'- 4 1/4"	26'- 3 7/8"	4'- 5 7/8"	26'- 11"	104	56	106.608	2.292	300.249	28'- 2"	6	27'- 10"	2	18	3.839	227.565	3.807	167.223	K	
8	10	4	9"	6'- 8 1/2"	0'- 5 1/4"	3'- 5 7/8"	0'- 6 3/8"	0'- 4 1/2"	26'- 3 7/8"	4'- 5 7/8"	26'- 11"	104	72	112.256	2.526	351.619	28'- 2"	6	27'- 10"	2	22	4.033	241.371	3.977	167.223	O	
9	4	4	9"	7'- 6 1/8"	0'- 5 1/4"	3'- 10 3/4"	0'- 6 7/8"	0'- 4 1/2"	29'- 4"	5'- 1 4"	29'- 11"	116	24	105.332	2.098	323.991	31'- 2"	6	30'- 10"	2	10	3.699	217.979	3.727	185.247	C	
9	6	4	9"	7'- 6"	0'- 5 1/2"	3'- 10 1/2"	0'- 7 1/4"	0'- 4 3/4"	29'- 4"	5'- 0"	30'- 0"	116	40	110.980	2.341	327.354	31'- 2"	6	30'- 10"	2	14	3.892	231.784	3.895	185.247	G	
9	8	4	9"	7'- 5 7/8"	0'- 5 3/4"	3'- 10 1/4"	0'- 7 5/8"	0'- 5"	29'- 4"	4'- 11 3/4"	30'- 0"	116	56	116.628	2.581	375.366	31'- 2"	6	30'- 10"	2	18	4.102	245.589	4.081	185.247	L	
9	10	4	9"	7'- 5 3/4"	0'- 6"	3'- 10"	0'- 8"	0'- 5 1/4"	29'- 4"	4'- 11 1/2"	30'- 1"	116	72	122.276	2.822	404.345	31'- 2"	6	30'- 10"	2	22	4.295	259.395	4.248	185.247	P	
9	12	4	8"	7'- 5 3/4"	0'- 6"	3'- 10"	0'- 8"	0'- 5 1/4"	29'- 4"	4'- 11 1/2"	30'- 1"	116	88	127.924	3.015	462.333	31'- 2"	6	30'- 10"	2	26	4.505	273.200	4.434	185.247	T	
10	4	4	8"	8'- 3 1/4"	0'- 6 1/4"	4'- 2 1/2"	0'- 8 3/8"	0'- 5 1/2"	32'- 4"	5'- 6 1/2"	33'- 1"	128	24	115.352	2.456	400.792	34'- 2"	6	33'- 10"	2	10	3.933	236.003	3.971	203.271	D	
10	6	4	9"	8'- 3 1/8"	0'- 6 1/2"	4'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	32'- 4"	5'- 6 1/4"	33'- 1"	128	40	121.000	2.703	416.574	34'- 2"	6	33'- 10"	2	14	4.123	249.808	4.136	203.271	H	
10	8	4	8"	8'- 3 1/8"	0'- 6 1/2"	4'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	32'- 4"	5'- 6 1/4"	33'- 1"	128	56	126.648	2.896	471.785	34'- 2"	6	33'- 10"	2	18	4.333	263.613	4.322	203.271	L	
10	10	4	8"	8'- 3"	0'- 6 3/4"	4'- 2"	0'- 9"	0'- 6"	32'- 4"	5'- 6"	33'- 2"	128	72	132.296	3.141	511.840	34'- 2"	6	33'- 10"	2	22	4.523	277.419	4.487	203.271	P	
10	12	5	11"	8'- 2 7/8"	0'- 7 1/8"	4'- 1 3/4"	0'- 9 1/2"	0'- 6 1/4"	32'- 4"	5'- 5 3/4"	33'- 2"	128	88	137.944	3.388	520.692	34'- 2"	6	33'- 10"	2	26	4.713	291.224	4.652	203.271	T	
12	6	5	9"	9'- 9 5/8"	0'- 8 1/8"	4'- 10 3/8"	0'- 10 7/8"	0'- 7 1/4"	38'- 4 1/8"	6'- 7 7/8"	39'- 4"	152	40	141.040	3.421	550.479	40'- 2"	6	39'- 10"	2	14	4.543	285.856	4.576	239.319	H	
12	8	5	9"	9'- 9 1/2"	0'- 8 3/8"	4'- 10 1/8"	0'- 11 1/4"	0'- 7 1/2"	38'- 4 1/8"	6'- 6 7/8"	39'- 4"	152	56	146.688	3.678	554.318	40'- 2"	6	39'- 10"	2	18	4.729	299.661	4.737	239.319	L	
12	10	5	9"	9'- 9 1/2"	0'- 8 3/8"	4'- 10 1/8"	0'- 11 1/4"	0'- 7 1/2"	38'- 4 1/8"	6'- 6 7/8"	39'- 4"	152	72	152.336	3.870	628.438	40'- 2"	6	39'- 10"	2	22	4.939	313.467	4.922	239.319	P	
12	12	5	9"	9'- 9 3/8"	0'- 8 5/8"	4'- 9 7/8"	0'- 11 5/8"	0'- 7 3/4"	38'- 4 1/8"	6'- 6 5/8"	39'- 5"	152	88	157.984	4.123	681.877	40'- 2"	6	39'- 10"	2	26	5.124	327.272	5.083	239.319	T	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h2>TRIPLE BOX CULVERTS</h2> <h3>5 TO 10 FT. FILLS</h3> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	REVISION DATE	SHEET 2 OF 2
			07/11	1004.10

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCT-DT.

DIMENSIONS						REINFORCING STEEL																										
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB	T2 BOTTOM SLAB	T3 EXTERIOR WALL (IN.)	T4 INTERIOR WALL (IN.)	A	B	C	D	E	F	BH1			BH2			BH3			BH4			BV1			BV2					
												SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH	
3	3	8"	8"	8"	8"	9	9'-0"	9	9'-0"	1	1'-0"	4	12"	10'-3"	4	12"	11'-4"	--	----	----	----	4	12"	2'-4"	2'-8"	4'-9"	4	12"	4'-0"	4	12"	4'-0"
3	4	8"	8"	8"	8"	9	9'-0"	9	9'-0"	2	2'-0"	4	12"	10'-3"	4	12"	11'-4"	--	----	----	----	4	12"	2'-4"	3'-2"	5'-3"	4	12"	5'-0"	4	12"	5'-0"
4	3	8"	8"	8"	8"	12	12'-0"	12	12'-0"	1	1'-0"	4	12"	13'-3"	4	12"	14'-4"	--	----	----	----	4	12"	2'-4"	2'-8"	4'-9"	4	12"	4'-0"	4	12"	4'-0"
4	4	8"	8"	8"	8"	12	12'-0"	12	12'-0"	2	2'-0"	4	12"	13'-3"	4	12"	14'-4"	--	----	----	----	4	12"	2'-4"	3'-2"	5'-3"	4	12"	5'-0"	4	12"	5'-0"
4	5	8"	8"	8"	8"	12	12'-0"	12	12'-0"	3	3'-0"	4	12"	13'-3"	4	12"	14'-4"	--	----	----	----	4	12"	2'-4"	3'-8"	5'-9"	4	12"	6'-0"	4	12"	6'-0"
4	6	8"	8"	8"	8"	12	12'-0"	12	12'-0"	4	4'-0"	4	12"	13'-3"	4	12"	14'-4"	--	----	----	----	4	12"	2'-4"	4'-2"	6'-3"	4	12"	7'-0"	4	12"	7'-0"
5	3	8"	8"	8"	8"	15	15'-0"	15	15'-0"	1	1'-0"	4	12"	16'-4"	4	12"	17'-3"	4	12"	2'-6"	4'-9"	4	12"	2'-4"	2'-8"	4'-9"	4	12"	4'-0"	4	12"	4'-0"
5	4	8"	8"	8"	8"	15	15'-0"	15	15'-0"	2	2'-0"	4	12"	16'-4"	4	12"	17'-3"	4	12"	2'-6"	4'-9"	4	12"	2'-4"	3'-2"	5'-3"	4	12"	5'-0"	4	12"	5'-0"
5	5	8"	8"	8"	8"	15	15'-0"	15	15'-0"	3	3'-0"	4	12"	16'-4"	4	12"	17'-3"	3	12"	2'-6"	4'-10"	4	12"	2'-4"	3'-8"	5'-9"	4	12"	6'-0"	4	12"	6'-0"
5	6	8"	8"	8"	8"	15	15'-0"	15	15'-0"	4	4'-0"	4	12"	16'-4"	4	12"	17'-3"	3	12"	2'-9"	5'-3"	4	12"	2'-4"	4'-2"	6'-3"	4	12"	7'-0"	4	12"	7'-0"
5	7	8"	8"	8"	8"	15	15'-0"	15	15'-0"	5	5'-0"	4	12"	16'-4"	4	12"	17'-3"	4	12"	2'-11"	5'-7"	4	12"	2'-4"	4'-8"	6'-9"	5	12"	8'-0"	4	12"	8'-0"
6	4	9"	9"	8"	8"	18	18'-0"	18	18'-0"	2	2'-0"	4	12"	19'-4"	4	12"	20'-3"	4	12"	2'-9"	5'-2"	4	12"	2'-4"	3'-3"	5'-4"	4	12"	5'-2"	4	12"	5'-2"
6	5	9"	9"	8"	8"	18	18'-0"	18	18'-0"	3	3'-0"	4	11"	19'-4"	4	11"	20'-3"	4	11"	2'-9"	5'-2"	4	11"	2'-4"	3'-9"	5'-10"	4	12"	6'-2"	4	12"	6'-2"
6	6	9 1/4"	9 1/4"	8"	8"	18	18'-0"	18	18'-0"	4	4'-0"	4	11"	19'-4"	4	11"	20'-3"	4	11"	2'-10"	5'-5"	4	11"	2'-4"	4'-4"	6'-4"	4	12"	7'-2"	4	12"	7'-2"
6	7	9 1/4"	9 1/4"	8"	8"	18	18'-0"	18	18'-0"	5	5'-0"	4	11"	19'-4"	4	11"	20'-3"	4	11"	3'-1"	5'-9"	4	11"	2'-4"	4'-10"	6'-10"	5	12"	8'-2"	4	12"	8'-2"
6	8	9 1/4"	9 1/4"	8"	8"	18	18'-0"	18	18'-0"	6	6'-0"	4	11"	19'-4"	4	11"	20'-3"	4	11"	3'-3"	6'-2"	4	11"	2'-4"	5'-4"	7'-4"	5	12"	9'-2"	4	12"	9'-2"
7	4	10 1/2"	10 1/2"	8"	8"	21	21'-0"	21	21'-0"	2	2'-0"	4	10"	22'-4"	4	10"	23'-3"	3	10"	2'-11"	5'-8"	4	10"	2'-4"	3'-5"	5'-5"	4	12"	5'-5"	4	12"	5'-5"
7	6	10 3/4"	10 3/4"	8"	8"	21	21'-0"	21	21'-0"	4	4'-0"	4	10"	22'-4"	4	10"	23'-3"	3	10"	3'-0"	5'-8"	4	10"	2'-4"	4'-5"	6'-6"	4	12"	7'-5"	4	12"	7'-5"
7	8	11"	11"	8"	8"	21	21'-0"	21	21'-0"	6	6'-0"	4	9"	22'-4"	4	9"	23'-3"	3	9"	3'-5"	6'-7"	4	9"	2'-4"	5'-5"	7'-6"	5	12"	9'-6"	4	12"	9'-6"
7	10	11"	11"	8 1/2"	8"	21	21'-0"	21	21'-0"	8	8'-0"	4	9"	22'-1"	4	9"	23'-5"	--	----	----	----	5	9"	2'-6"	6'-7"	8'-9"	5	7"	11'-6"	4	12"	11'-6"
8	4	11 1/4"	11 1/4"	8"	8"	24	24'-0"	24	24'-0"	2	2'-0"	4	9"	25'-4"	5	9"	26'-3"	3	9"	3'-2"	6'-11"	4	9"	2'-4"	3'-6"	5'-7"	4	11"	5'-7"	4	12"	5'-7"
8	6	12"	12"	8"	8"	24	24'-0"	24	24'-0"	4	4'-0"	4	9"	25'-4"	5	9"	26'-3"	3	9"	3'-2"	6'-11"	4	9"	2'-4"	4'-6"	6'-7"	4	12"	7'-8"	4	12"	7'-8"
8	8	12 1/4"	12 1/4"	8"	8"	24	24'-0"	24	24'-0"	6	6'-0"	4	9"	25'-4"	5	9"	26'-3"	3	9"	3'-6"	6'-9"	4	9"	2'-4"	5'-7"	7'-7"	5	12"	9'-8"	4	12"	9'-8"
8	10	12 1/2"	12 1/2"	8"	8"	24	24'-0"	24	24'-0"	8	8'-0"	4	9"	25'-0"	5	9"	26'-3"	3	9"	3'-11"	7'-7"	5	9"	2'-6"	6'-9"	8'-10"	5	7"	11'-9"	4	12"	11'-9"
9	4	13"	13"	8"	8"	27	27'-0"	27	27'-0"	2	2'-0"	5	9"	28'-4"	5	9"	29'-3"	3	9"	3'-4"	6'-5"	4	9"	2'-9"	3'-7"	6'-11"	4	10"	5'-10"	4	12"	5'-10"
9	6	13"	13"	8"	8"	27	27'-0"	27	27'-0"	4	4'-0"	5	9"	28'-4"	5	9"	29'-3"	3	9"	3'-4"	6'-5"	4	9"	2'-9"	4'-7"	7'-11"	4	12"	7'-10"	4	12"	7'-10"
9	8	13 1/4"	13 1/4"	8"	8"	27	27'-0"	27	27'-0"	6	6'-0"	5	9"	28'-4"	5	9"	29'-3"	3	9"	3'-7"	6'-11"	4	9"	2'-9"	5'-8"	8'-11"	5	12"	9'-10"	4	12"	9'-10"
9	10	13 1/4"	13 1/4"	8"	8"	27	27'-0"	27	27'-0"	8	8'-0"	5	9"	28'-0"	5	9"	29'-3"	3	9"	4'-0"	7'-9"	5	9"	2'-11"	6'-10"	9'-4"	6	8 1/2"	11'-10"	4	12"	11'-10"
9	12	13 1/2"	13 1/2"	9 1/2"	8"	27	27'-0"	27	27'-0"	10	10'-0"	5	8"	28'-3"	5	8"	29'-6"	4	8"	4'-5"	8'-6"	5	9"	2'-11"	7'-10"	10'-4"	6	7 1/2"	13'-11"	4	12"	13'-11"
10	4	14 1/4"	14 1/4"	8"	8"	30	30'-0"	30	30'-0"	2	2'-0"	5	9"	31'-0"	5	9"	32'-3"	--	----	----	----	5	9"	2'-11"	3'-11"	6'-5"	4	10"	6'-0"	4	12"	6'-0"
10	6	14 1/2"	14 1/2"	8"	8"	30	30'-0"	30	30'-0"	4	4'-0"	5	9"	31'-3"	5	9"	32'-3"	3	9"	3'-6"	6'-10"	4	9"	2'-9"	4'-9"	7'-2"	4	12"	8'-0"	4	12"	8'-0"
10	8	14 1/2"	14 1/2"	8"	8"	30	30'-0"	30	30'-0"	6	6'-0"	5	9"	31'-0"	5	9"	32'-3"	--	----	----	----	5	9"	2'-11"	5'-11"	8'-5"	5	12"	10'-0"	4	12"	10'-0"
10	10	14 1/2"	14 1/2"	8"	8"	30	30'-0"	30	30'-0"	8	8'-0"	5	9"	31'-0"	5	9"	32'-3"	3	9"	4'-1"	7'-11"	5	9"	2'-11"	6'-11"	9'-5"	6	9"	12'-0"	4	12"	12'-0"
10	12	14 3/4"	14 3/4"	9 1/2"	8"	30	30'-0"	30	30'-0"	10	10'-0"	5	9"	31'-0"	5	9"	32'-6"	3	9"	4'-6"	8'-9"	6	9"	3'-0"	8'-1"	10'-8"	6	7 1/2"	14'-1"	4	12"	14'-1"
12	6	17"	17"	8"	8"	36	36'-0"	36	36'-0"	4	4'-0"	6	9"	37'-3"	6	9"	38'-4"	3	9"	3'-11"	7'-8"	4	9"	3'-2"	4'-11"	7'-10"	4	12"	8'-6"	4	12"	8'-6"
12	8	17"	17"	8"	8"	36	36'-0"	36	36'-0"	6	6'-0"	6	9"	37'-3"	6	9"	38'-4"	3	9"	3'-11"	7'-8"	4	9"	3'-2"	5'-11"	8'-10"	5	12"	10'-6"	4	12"	10'-6"
12	10	17 1/4"	17 1/4"	8"	8"	36	36'-0"	36	36'-0"	8	8'-0"	6	9"	37'-0"	6	9"	38'-4"	3	9"	4'-4"	8'-5"	5	9"	3'-4"	7'-2"	10'-11"	6	9"	12'-6"	4	12"	12'-6"
12	12	17 1/4"	17 1/4"	9 1/2"	8"	36	36'-0"	36	36'-0"	10	10'-0"	6	9"	37'-0"	6	9"	38'-7"	3	9"	4'-9"	9'-2"	6	9"	3'-5"	8'-4"	11'-4"	5	5"	14'-6"	4	12"	14'-6"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2 REVISION DATE
1004.11 07/11

TRIPLE BOX CULVERTS
10 TO 20 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCT-DT.

BCT-20

SPAN		HGHT	REINFORCING STEEL											QUAN./LF		HEADWALLS											
(FT.)	(FT.)	SIZE	SPACING C-C	BT1								NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS./LONG. FT.)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW1		NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. #4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. #4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
				a	b	c	d	e	f	g	LENGTH						HEADWALL LENGTH	SIZE	LENGTH								
3	3	4	12"	2'-7"	0'- 4"	1'-10"	0'- 5/8"	0'- 3/4"	11'-3"	1'-3"	11'-9"	44	16	42.388	0.989	108.604	13'- 2"	6	12'-10"	2	8	1.827	102.932	1.808	77.103	A	
3	4	4	12"	2'-7"	0'- 4"	1'-10"	0'- 5/8"	0'- 3/4"	11'-3"	1'-3"	11'-9"	44	24	45.212	1.087	116.956	13'- 2"	6	12'-10"	2	10	1.932	109.835	1.901	77.103	C	
4	3	4	12"	3'-5"	0'- 4"	2'-3"	0'- 5/8"	0'- 3/4"	14'-3"	1'-10"	14'-9"	56	16	52.408	1.136	128.644	16'- 2"	6	15'-10"	2	8	2.131	120.956	2.121	95.127	A	
4	4	4	12"	3'-5"	0'- 4"	2'-3"	0'- 5/8"	0'- 3/4"	14'-3"	1'-10"	14'-9"	56	24	55.232	1.234	136.996	16'- 2"	6	15'-10"	2	10	2.236	127.859	2.214	95.127	C	
4	5	4	12"	3'-5"	0'- 4"	2'-3"	0'- 5/8"	0'- 3/4"	14'-3"	1'-10"	14'-9"	56	32	58.056	1.332	145.348	16'- 2"	6	15'-10"	2	12	2.341	134.761	2.307	95.127	E	
4	6	4	12"	3'-5"	0'- 4"	2'-3"	0'- 5/8"	0'- 3/4"	14'-3"	1'-10"	14'-9"	56	40	60.880	1.430	153.700	16'- 2"	6	15'-10"	2	14	2.446	141.664	2.399	95.127	G	
5	3	4	12"	4'-2"	0'- 4"	2'-8"	0'- 5/8"	0'- 3/4"	17'-4"	2'-5"	17'-9"	68	16	62.428	1.281	161.335	19'- 2"	6	18'-10"	2	8	2.434	138.980	2.435	113.151	A	
5	4	4	12"	4'-2"	0'- 4"	2'-8"	0'- 5/8"	0'- 3/4"	17'-4"	2'-5"	17'-9"	68	24	65.252	1.379	169.687	19'- 2"	6	18'-10"	2	10	2.539	145.883	2.527	113.151	C	
5	5	4	12"	4'-2"	0'- 4"	2'-8"	0'- 5/8"	0'- 3/4"	17'-4"	2'-5"	17'-9"	68	32	68.076	1.478	172.608	19'- 2"	6	18'-10"	2	12	2.644	152.785	2.620	113.151	E	
5	6	4	12"	4'-2"	0'- 4"	2'-8"	0'- 5/8"	0'- 3/4"	17'-4"	2'-5"	17'-9"	68	40	70.900	1.576	181.562	19'- 2"	6	18'-10"	2	14	2.750	159.688	2.713	113.151	G	
5	7	4	12"	4'-2"	0'- 4"	2'-8"	0'- 5/8"	0'- 3/4"	17'-4"	2'-5"	17'-9"	68	48	73.724	1.673	202.880	19'- 2"	6	18'-10"	2	16	2.855	166.591	2.806	113.151	I	
6	4	4	12"	4'-11"	0'- 5"	3'-0"	0'- 6 5/8"	0'- 4 1/4"	20'-4"	2'-11"	20'-10"	80	24	75.272	1.653	191.868	22'- 2"	6	21'-10"	2	10	2.799	163.907	2.797	131.175	C	
6	5	4	11"	4'-11"	0'- 5"	3'-0"	0'- 6 5/8"	0'- 4 1/4"	20'-4"	2'-11"	20'-10"	80	32	78.096	1.751	210.223	22'- 2"	6	21'-10"	2	12	2.904	170.809	2.889	131.175	E	
6	6	4	11"	4'-11"	0'- 5 1/4"	3'-0"	0'- 7"	0'- 4 1/2"	20'-4"	2'-10"	20'-11"	80	40	80.920	1.881	219.582	22'- 2"	6	21'-10"	2	14	3.016	177.712	2.990	131.175	H	
6	7	4	11"	4'-11"	0'- 5 1/4"	3'-0"	0'- 7"	0'- 4 1/2"	20'-4"	2'-10"	20'-11"	80	48	83.744	1.978	235.377	22'- 2"	6	21'-10"	2	16	3.121	184.615	3.082	131.175	J	
6	8	4	11"	4'-11"	0'- 5 1/4"	3'-0"	0'- 7"	0'- 4 1/2"	20'-4"	2'-10"	20'-11"	80	56	86.568	2.076	245.767	22'- 2"	6	21'-10"	2	18	3.227	191.517	3.175	131.175	L	
7	4	4	10"	5'-7"	0'- 6 1/2"	3'-5"	0'- 8 3/4"	0'- 5 3/4"	23'-4"	3'-3"	24'-1"	92	24	85.292	2.036	231.430	25'- 2"	6	24'-10"	2	10	3.031	181.931	3.039	149.199	D	
7	6	4	10"	5'-7"	0'- 6 3/4"	3'-5"	0'- 9"	0'- 6"	23'-4"	3'-2"	24'-1"	92	40	90.940	2.269	249.062	25'- 2"	6	24'-10"	2	14	3.228	195.736	3.211	149.199	H	
7	8	4	9"	5'-7"	0'- 7"	3'-5"	0'- 9 3/8"	0'- 6 1/4"	23'-4"	3'-2"	24'-2"	92	56	96.588	2.500	291.625	25'- 2"	6	24'-10"	2	18	3.425	209.541	3.383	149.199	L	
7	10	4	9"	5'-7"	0'- 7"	3'-5"	0'- 9 3/8"	0'- 6 1/4"	23'-5"	3'-2"	24'-3"	92	72	102.236	2.731	332.978	25'- 2"	6	24'-10"	2	22	3.635	223.347	3.569	149.199	P	
8	4	4	9"	6'-3"	0'- 7 3/4"	3'-10"	0'- 10 1/2"	0'- 7"	26'-4"	3'-7"	27'-3"	104	24	95.312	2.431	300.279	28'- 2"	6	27'-10"	2	10	3.233	199.955	3.251	167.223	D	
8	6	4	9"	6'-3"	0'- 8"	3'-10"	0'- 10 7/8"	0'- 7 1/4"	26'-4"	3'-7"	27'-3"	104	40	100.960	2.668	317.493	28'- 2"	6	27'-10"	2	14	3.428	213.760	3.421	167.223	H	
8	8	4	9"	6'-3"	0'- 8 1/4"	3'-10"	0'- 11 1/8"	0'- 7 1/2"	26'-4"	3'-6"	27'-4"	104	56	106.608	2.905	344.092	28'- 2"	6	27'-10"	2	18	3.622	227.565	3.591	167.223	L	
8	10	4	9"	6'-3"	0'- 8 1/2"	3'-10"	0'- 11 1/2"	0'- 7 3/4"	26'-4"	3'-6"	27'-4"	104	72	112.256	3.139	400.681	28'- 2"	6	27'-10"	2	22	3.817	241.371	3.760	167.223	P	
9	4	5	9"	7'-0"	0'- 9"	4'-3"	1'- 1/8"	0'- 8 1/8"	29'-4"	4'-0"	30'-5"	116	24	105.332	2.871	390.708	31'- 2"	6	30'-10"	2	10	3.412	217.979	3.440	185.247	D	
9	6	5	9"	7'-0"	0'- 9"	4'-3"	1'- 1/8"	0'- 8 1/8"	29'-4"	4'-0"	30'-5"	116	40	110.980	3.067	406.744	31'- 2"	6	30'-10"	2	14	3.622	231.784	3.625	185.247	H	
9	8	5	9"	7'-0"	0'- 9 1/4"	4'-3"	1'- 1/2"	0'- 8 3/8"	29'-4"	4'-0"	30'-5"	116	56	116.628	3.308	433.034	31'- 2"	6	30'-10"	2	18	3.814	245.589	3.793	185.247	L	
9	10	5	9"	7'-0"	0'- 9 1/4"	4'-3"	1'- 1/2"	0'- 8 3/8"	29'-4"	4'-0"	30'-5"	116	72	122.276	3.501	497.976	31'- 2"	6	30'-10"	2	22	4.025	259.395	3.978	185.247	P	
9	12	5	8"	7'-1"	0'- 9 1/2"	4'-3"	1'- 7/8"	0'- 8 5/8"	29'-7"	3'-11"	30'-9"	116	88	127.924	3.869	590.289	31'- 2"	6	30'-10"	2	26	4.217	273.200	4.146	185.247	T	
10	4	5	9"	7'-8"	0'- 10 1/4"	4'-8"	1'- 1 1/8"	0'- 9 3/8"	32'-3"	4'-5"	33'-7"	128	24	115.352	3.361	425.479	34'- 2"	6	33'-10"	2	10	3.567	236.003	3.605	203.271	D	
10	6	5	9"	7'-8"	0'- 10 1/2"	4'-8"	1'- 2 1/4"	0'- 9 5/8"	32'-3"	4'-4"	33'-7"	128	40	121.000	3.607	442.615	34'- 2"	6	33'-10"	2	14	3.757	249.808	3.771	203.271	H	
10	8	5	9"	7'-8"	0'- 10 1/2"	4'-8"	1'- 2 1/4"	0'- 9 5/8"	32'-3"	4'-4"	33'-7"	128	56	126.648	3.803	470.995	34'- 2"	6	33'-10"	2	18	3.968	263.613	3.956	203.271	L	
10	10	5	9"	7'-8"	0'- 10 1/2"	4'-8"	1'- 2 1/4"	0'- 9 5/8"	32'-3"	4'-4"	33'-7"	128	72	132.296	3.996	531.092	34'- 2"	6	33'-10"	2	22	4.178	277.419	4.141	203.271	P	
10	12	5	9"	7'-9"	0'- 10 3/4"	4'-8"	1'- 2 3/8"	0'- 9 7/8"	32'-3"	4'-4"	33'-11"	128	88	137.944	4.372	598.219	34'- 2"	6	33'-10"	2	26	4.368	291.224	4.307	203.271	T	
12	6	6	9"	9'-1"	1'- 1"	5'-5"	1'- 5 5/8"	1'- 0"	38'-3"	5'-3"	39'-11"	152	40	141.040	4.725	656.619	40'- 2"	6	39'-10"	2	14	4.013	285.856	4.046	239.319	I	
12	8	6	9"	9'-1"	1'- 1"	5'-5"	1'- 5 5/8"	1'- 0"	38'-3"	5'-3"	39'-11"	152	56	146.688	4.920	682.088	40'- 2"	6	39'-10"	2	18	4.223	299.661	4.232	239.319	M	
12	10	6	9"	9'-1"	1'- 1 1/4"	5'-5"	1'- 6"	1'- 1/4"	38'-3"	5'-2"	39'-11"	152	72	152.336	5.172	746.974	40'- 2"	6	39'-10"	2	22	4.409	313.467	4.392	239.319	Q	
12	12	6	9"	9'-2"	1'- 1 1/4"	5'-5"	1'- 6"	1'- 1/4"	38'-6"	5'-2"	40'-2"	152	88	157.984	5.502	818.885	40'- 2"	6	39'-10"	2	26	4.619	327.272	4.578	239.319	U	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h2>TRIPLE BOX CULVERTS</h2> <h3>10 TO 20 FT. FILLS</h3> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCT-DT.

DIMENSIONS						REINFORCING STEEL																										
SPAN (FT.)	HGHT (FT.)	T1 TOP SLAB	T2 BOTTOM SLAB	T3 EXTERIOR WALL (IN.)	T4 INTERIOR WALL (IN.)	A	B	C	D	E	F	BH1			BH2			BH3			BH4			BV1			BV2					
												SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	LENGTH	SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH
3	3	8"	8"	8"	8"	9	9'-0"	9	9'-0"	1	1'-0"	4	12"	10'-3"	4	12"	11'-4"	--	---	----	----	4	12"	2'-4"	2'-8"	4'-9"	4	12"	4'-0"	4	12"	4'-0"
3	4	8"	8"	8"	8"	9	9'-0"	9	9'-0"	2	2'-0"	4	12"	10'-3"	4	12"	11'-4"	--	---	----	----	4	12"	2'-4"	3'-2"	5'-3"	4	12"	5'-0"	4	12"	5'-0"
4	3	8 1/2"	8 1/2"	8"	8"	12	12'-0"	12	12'-0"	1	1'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	2'-9"	4'-9"	4	12"	4'-1"	4	12"	4'-1"
4	4	8 1/2"	8 1/2"	8"	8"	12	12'-0"	12	12'-0"	2	2'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	3'-3"	5'-3"	4	12"	5'-1"	4	12"	5'-1"
4	5	8 1/2"	8 1/2"	8"	8"	12	12'-0"	12	12'-0"	3	3'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	3'-9"	5'-9"	4	12"	6'-1"	4	12"	6'-1"
4	6	8 1/2"	8 1/2"	8"	8"	12	12'-0"	12	12'-0"	4	4'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	4'-3"	6'-3"	5	12"	7'-1"	4	12"	7'-1"
5	3	10"	10"	8"	8"	15	15'-0"	15	15'-0"	1	1'-0"	4	12"	16'-4"	4	12"	17'-3"	3	12"	2'-6"	4'-10"	4	12"	2'-4"	2'-10"	4'-11"	4	12"	4'-4"	4	12"	4'-4"
5	4	10"	10"	8"	8"	15	15'-0"	15	15'-0"	2	2'-0"	4	12"	16'-4"	4	12"	17'-3"	3	12"	2'-6"	4'-10"	4	12"	2'-4"	3'-4"	5'-5"	4	12"	5'-4"	4	12"	5'-4"
5	5	10 1/4"	10 1/4"	8"	8"	15	15'-0"	15	15'-0"	3	3'-0"	4	12"	16'-4"	4	12"	17'-3"	3	12"	2'-9"	5'-3"	4	12"	2'-4"	3'-11"	5'-11"	4	12"	6'-4"	4	12"	6'-4"
5	6	10"	10"	8"	8"	15	15'-0"	15	15'-0"	4	4'-0"	4	12"	16'-4"	4	12"	17'-3"	4	12"	2'-11"	5'-6"	4	12"	2'-4"	4'-4"	6'-5"	5	12"	7'-4"	4	12"	7'-4"
5	7	10"	10"	8"	8"	15	15'-0"	15	15'-0"	5	5'-0"	4	12"	16'-4"	4	12"	17'-3"	4	12"	3'-1"	5'-11"	4	12"	2'-4"	4'-10"	6'-11"	5	12"	8'-3"	4	12"	8'-3"
6	4	12"	12"	8"	8"	18	18'-0"	18	18'-0"	2	2'-0"	4	10"	19'-4"	4	10"	20'-3"	--	---	----	----	4	10"	2'-4"	3'-6"	5'-7"	4	12"	5'-8"	4	12"	5'-8"
6	5	12 1/4"	12 1/4"	8"	8"	18	18'-0"	18	18'-0"	3	3'-0"	4	10"	19'-4"	4	10"	20'-3"	--	---	----	----	4	10"	2'-4"	4'-1"	6'-1"	4	12"	6'-8"	4	12"	6'-8"
6	6	12 1/4"	12 1/4"	8"	8"	18	18'-0"	18	18'-0"	4	4'-0"	4	10"	19'-4"	4	10"	20'-3"	--	---	----	----	4	10"	2'-4"	4'-7"	6'-7"	4	12"	7'-8"	4	12"	7'-8"
6	7	11 1/2"	11 1/2"	8"	8"	18	18'-0"	18	18'-0"	5	5'-0"	4	10"	19'-4"	4	10"	20'-3"	3	10"	3'-3"	6'-3"	4	10"	2'-4"	5'-0"	7'-0"	5	12"	8'-6"	4	12"	8'-6"
6	8	11 3/4"	11 3/4"	8"	8"	18	18'-0"	18	18'-0"	6	6'-0"	4	10"	19'-0"	4	10"	20'-3"	--	---	----	----	5	10"	2'-6"	5'-8"	7'-9"	5	9"	9'-7"	4	12"	9'-7"
7	4	13 1/4"	13 1/4"	8"	8"	21	21'-0"	21	21'-0"	2	2'-0"	4	9"	22'-4"	5	9"	23'-3"	--	---	----	----	4	9"	2'-4"	3'-8"	5'-8"	4	12"	5'-10"	4	12"	5'-10"
7	6	13 1/4"	13 1/4"	8"	8"	21	21'-0"	21	21'-0"	4	4'-0"	4	9"	22'-4"	5	9"	23'-3"	--	---	----	----	4	9"	2'-4"	4'-8"	6'-8"	4	12"	7'-10"	4	12"	7'-10"
7	8	13 1/4"	13 1/4"	8"	8"	21	21'-0"	21	21'-0"	6	6'-0"	4	9"	22'-4"	5	9"	23'-3"	3	9"	3'-7"	6'-11"	4	9"	2'-4"	5'-8"	7'-8"	5	9"	9'-10"	4	12"	9'-10"
7	10	13 1/4"	13 1/4"	9 1/2"	8"	21	21'-0"	21	21'-0"	8	8'-0"	4	9"	22'-3"	5	9"	23'-6"	3	9"	4'-0"	7'-9"	5	9"	2'-6"	6'-10"	8'-11"	7	11 1/2"	11'-10"	4	12"	11'-10"
8	4	15"	15"	8"	8"	24	24'-0"	24	24'-0"	2	2'-0"	5	9"	25'-4"	5	9"	26'-3"	--	---	----	----	4	9"	2'-9"	3'-9"	6'-3"	4	12"	6'-2"	4	12"	6'-2"
8	6	15"	15"	8"	8"	24	24'-0"	24	24'-0"	4	4'-0"	5	9"	25'-4"	5	9"	26'-3"	--	---	----	----	4	9"	2'-9"	4'-9"	7'-3"	4	12"	8'-1"	4	12"	8'-1"
8	8	15"	15"	8"	8"	24	24'-0"	24	24'-0"	6	6'-0"	5	9"	25'-4"	5	9"	26'-3"	3	9"	3'-9"	7'-3"	4	9"	2'-9"	5'-9"	8'-3"	5	9 1/2"	10'-1"	4	12"	10'-1"
8	10	15"	15"	9 1/2"	8"	24	24'-0"	24	24'-0"	8	8'-0"	5	9"	25'-3"	5	9"	26'-6"	3	9"	4'-1"	8'-0"	5	9"	2'-11"	6'-11"	9'-6"	7	11 1/2"	12'-1"	4	12"	12'-1"
9	4	16 1/2"	16 1/2"	8"	8"	27	27'-0"	27	27'-0"	2	2'-0"	5	8"	28'-4"	5	8"	29'-3"	--	---	----	----	4	8"	2'-9"	3'-11"	6'-4"	4	12"	6'-5"	4	12"	6'-5"
9	6	16 1/2"	16 1/2"	8"	8"	27	27'-0"	27	27'-0"	4	4'-0"	5	9"	28'-4"	5	9"	29'-3"	--	---	----	----	4	9"	2'-9"	4'-11"	7'-4"	4	12"	8'-4"	4	12"	8'-4"
9	8	16 1/2"	16 1/2"	8"	8"	27	27'-0"	27	27'-0"	6	6'-0"	5	8"	28'-4"	5	8"	29'-3"	3	8"	3'-10"	7'-6"	4	8"	2'-9"	5'-11"	8'-4"	5	9 1/2"	10'-4"	4	12"	10'-4"
9	10	16 1/2"	16 1/2"	9"	8"	27	27'-0"	27	27'-0"	8	8'-0"	5	8"	28'-2"	5	8"	29'-6"	3	8"	4'-3"	8'-3"	5	8"	2'-11"	7'-1"	9'-7"	7	11 1/2"	12'-4"	4	12"	12'-4"
9	12	16 3/4"	16 3/4"	11"	8"	27	27'-0"	27	27'-0"	10	10'-0"	6	9"	28'-0"	6	9"	29'-9"	--	---	----	----	7	9"	3'-7"	8'-6"	11'-7"	6	7 1/2"	14'-5"	4	12"	14'-5"
10	4	18 1/4"	18 1/4"	8"	8"	30	30'-0"	30	30'-0"	2	2'-0"	6	9"	31'-3"	6	9"	32'-3"	--	---	----	----	4	9"	3'-2"	4'-1"	6'-11"	4	12"	6'-8"	4	11"	6'-8"
10	6	18 1/4"	18 1/4"	8"	8"	30	30'-0"	30	30'-0"	4	4'-0"	6	9"	31'-3"	6	9"	32'-3"	--	---	----	----	4	9"	3'-2"	5'-1"	7'-11"	4	12"	8'-8"	4	11"	8'-8"
10	8	18 1/4"	18 1/4"	8"	8"	30	30'-0"	30	30'-0"	6	6'-0"	6	9"	31'-3"	6	9"	32'-3"	3	9"	4'-0"	7'-9"	4	9"	3'-2"	6'-1"	8'-11"	5	9 1/2"	10'-8"	4	11"	10'-8"
10	10	18 1/2"	18 1/2"	9"	8"	30	30'-0"	30	30'-0"	8	8'-0"	6	9"	31'-2"	6	9"	32'-5"	3	9"	4'-5"	8'-7"	5	9"	3'-4"	7'-3"	10'-2"	6	8"	12'-9"	4	11"	12'-9"
10	12	18 1/2"	18 1/2"	11"	8"	30	30'-0"	30	30'-0"	10	10'-0"	6	9"	31'-3"	6	9"	32'-9"	4	9"	4'-10"	9'-4"	6	9"	3'-5"	8'-5"	11'-5"	5	5 1/2"	14'-9"	4	11"	14'-9"
12	6	21 1/2"	21 1/2"	8"	8"	36	36'-0"	36	36'-0"	4	4'-0"	6	8"	37'-3"	6	8"	38'-4"	--	---	----	----	4	8"	3'-2"	5'-4"	8'-2"	4	12"	9'-3"	4	10"	9'-3"
12	8	21 1/2"	21 1/2"	8"	8"	36	36'-0"	36	36'-0"	6	6'-0"	6	8"	37'-3"	6	8"	38'-4"	3	8"	4'-3"	8'-4"	4	8"	3'-2"	6'-4"	9'-2"	5	9"	11'-3"	4	10"	11'-3"
12	10	21 1/2"	21 1/2"	8 1/2"	8"	36	36'-0"	36	36'-0"	8	8'-0"	6	8"	37'-1"	6	8"	38'-4"	3	8"	4'-8"	9'-1"	5	8"	3'-4"	7'-6"	10'-5"	6	8"	13'-3"	4	10"	13'-3"
12	12	21 3/4"	21 3/4"	11"	8"	36	36'-0"	36	36'-0"	10	10'-0"	6	8"	37'-6"	6	8"	38'-10"	4	8"	5'-1"	9'-10"	5	8"	3'-4"	8'-6"	11'-5"	5	5 1/2"	15'-3"	4	10"	15'-3"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2 REVISION DATE
1004.13 **07/11**

TRIPLE BOX CULVERTS
20 TO 30 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE


SPAN		REINFORCING STEEL		BT1										QUAN./LF		HEADWALLS										
(FT.)	(FT.)	SIZE	SPACING C-C	a	b	c	d	e	f	g	LENGTH	NO. BLT #4 BARS	NO. BLT #3 BARS	REINFORCING STEEL (LBS./LONG. JT)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G HEADWALL LENGTH	HW1 SIZE	HW1 LENGTH	NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. #4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. #4 (CY)	OUTLET REINFORCING STEEL (LBS)	WINGWALL
3	3	4	12"	2'-7"	0'-4"	1'-10"	0'-5 1/8"	0'-3 1/4"	11'-3"	1'-3"	11'-9"	44	16	42.388	0.989	108.604	13'-2"	6	12'-10"	2	8	1.827	102.932	1.808	77.103	A
3	4	4	12"	2'-7"	0'-4"	1'-10"	0'-5 1/8"	0'-3 1/4"	11'-3"	1'-3"	11'-9"	44	24	45.212	1.087	116.956	13'-2"	6	12'-10"	2	10	1.932	109.835	1.901	77.103	C
4	3	4	12"	3'-4"	0'-4 1/2"	2'-3"	0'-5 1/8"	0'-3 3/4"	14'-3"	1'-9"	14'-10"	56	16	52.408	1.181	129.180	16'-2"	6	15'-10"	2	8	2.118	120.956	2.108	95.127	A
4	4	4	12"	3'-4"	0'-4 1/2"	2'-3"	0'-5 1/8"	0'-3 3/4"	14'-3"	1'-9"	14'-10"	56	24	55.232	1.279	137.532	16'-2"	6	15'-10"	2	10	2.223	127.859	2.201	95.127	C
4	5	4	12"	3'-4"	0'-4 1/2"	2'-3"	0'-5 1/8"	0'-3 3/4"	14'-3"	1'-9"	14'-10"	56	32	58.056	1.377	145.884	16'-2"	6	15'-10"	2	12	2.328	134.761	2.294	95.127	E
4	6	4	12"	3'-4"	0'-4 1/2"	2'-3"	0'-5 1/8"	0'-3 3/4"	14'-3"	1'-9"	14'-10"	56	40	60.880	1.475	159.548	16'-2"	6	15'-10"	2	14	2.433	141.664	2.387	95.127	G
5	3	4	12"	4'-0"	0'-6"	2'-8"	0'-8"	0'-5 1/4"	17'-4"	2'-1"	18'-0"	68	16	62.428	1.500	158.051	19'-2"	6	18'-10"	2	8	2.383	138.980	2.383	113.151	B
5	4	4	12"	4'-0"	0'-6"	2'-8"	0'-8"	0'-5 1/4"	17'-4"	2'-1"	18'-0"	68	24	65.252	1.598	166.403	19'-2"	6	18'-10"	2	10	2.488	145.883	2.476	113.151	D
5	5	4	12"	4'-0"	0'-6 1/4"	2'-8"	0'-8 3/8"	0'-5 1/2"	17'-4"	2'-0"	18'-0"	68	32	68.076	1.723	175.587	19'-2"	6	18'-10"	2	12	2.584	152.785	2.560	113.151	F
5	6	4	12"	4'-0"	0'-6"	2'-8"	0'-8"	0'-5 1/4"	17'-4"	2'-1"	18'-0"	68	40	70.900	1.793	195.997	19'-2"	6	18'-10"	2	14	2.698	159.688	2.662	113.151	H
5	7	4	12"	4'-0"	0'-6"	2'-8"	0'-8"	0'-5 1/4"	17'-4"	2'-1"	18'-0"	68	48	73.724	1.891	206.168	19'-2"	6	18'-10"	2	16	2.803	166.591	2.754	113.151	J
6	4	4	10"	4'-8"	0'-8"	3'-0"	0'-10 1/8"	0'-7 1/4"	20'-4"	2'-5"	21'-3"	80	24	75.272	2.035	200.609	22'-2"	6	21'-10"	2	10	2.684	163.907	2.683	131.175	D
6	5	4	10"	4'-8"	0'-8 1/8"	3'-0"	0'-11 1/8"	0'-7 1/2"	20'-4"	2'-4"	21'-4"	80	32	78.096	2.165	209.517	22'-2"	6	21'-10"	2	12	2.779	170.809	2.764	131.175	F
6	6	4	10"	4'-8"	0'-8 1/8"	3'-0"	0'-11 1/8"	0'-7 1/2"	20'-4"	2'-4"	21'-4"	80	40	80.920	2.264	218.137	22'-2"	6	21'-10"	2	14	2.884	177.712	2.857	131.175	H
6	7	4	10"	4'-9"	0'-7 1/2"	3'-0"	0'-10 1/8"	0'-6 3/4"	20'-4"	2'-6"	21'-3"	80	48	83.744	2.265	243.488	22'-2"	6	21'-10"	2	16	3.022	184.615	2.983	131.175	J
6	8	4	10"	4'-8"	0'-7 3/4"	3'-0"	0'-10 1/2"	0'-7"	20'-4"	2'-5"	21'-3"	80	56	86.568	2.394	262.965	22'-2"	6	21'-10"	2	18	3.116	191.517	3.065	131.175	L
7	4	4	9"	5'-4"	0'-9 1/8"	3'-5"	1'-5/8"	0'-8 1/2"	23'-4"	2'-9"	24'-5"	92	24	85.292	2.436	262.329	25'-2"	6	24'-10"	2	10	2.884	181.931	2.892	149.199	D
7	6	4	9"	5'-4"	0'-9 1/8"	3'-5"	1'-5/8"	0'-8 1/2"	23'-4"	2'-9"	24'-5"	92	40	90.940	2.632	279.924	25'-2"	6	24'-10"	2	14	3.094	195.736	3.078	149.199	H
7	8	4	9"	5'-4"	0'-9 1/8"	3'-5"	1'-5/8"	0'-8 1/2"	23'-4"	2'-9"	24'-5"	92	56	96.588	2.826	325.580	25'-2"	6	24'-10"	2	18	3.305	209.541	3.263	149.199	L
7	10	4	9"	5'-6"	0'-9 1/8"	3'-5"	1'-5/8"	0'-8 1/2"	23'-7"	2'-9"	24'-8"	92	72	102.236	3.132	384.973	25'-2"	6	24'-10"	2	22	3.515	223.347	3.448	149.199	P
8	4	5	9"	6'-0"	0'-11"	3'-10"	1'-3"	0'-10 1/8"	26'-4"	3'-1"	27'-8"	104	24	95.312	2.963	345.960	28'-2"	6	27'-10"	2	10	3.029	199.955	3.047	167.223	D
8	6	5	9"	6'-0"	0'-11"	3'-10"	1'-3"	0'-10 1/8"	26'-4"	3'-1"	27'-8"	104	40	100.960	3.159	363.554	28'-2"	6	27'-10"	2	14	3.239	213.760	3.233	167.223	H
8	8	5	9"	6'-0"	0'-11"	3'-10"	1'-3"	0'-10 1/8"	26'-4"	3'-1"	27'-8"	104	56	106.608	3.353	408.729	28'-2"	6	27'-10"	2	18	3.450	227.565	3.418	167.223	L
8	10	5	9"	6'-2"	0'-11"	3'-10"	1'-3"	0'-10 1/8"	26'-7"	3'-1"	27'-11"	104	72	112.256	3.661	471.397	28'-2"	6	27'-10"	2	22	3.660	241.371	3.604	167.223	P
9	4	5	8"	6'-8"	1'-1/2"	4'-3"	1'-5 1/8"	0'-11 5/8"	29'-4"	3'-5"	30'-10"	116	24	105.332	3.510	414.630	31'-2"	6	30'-10"	2	10	3.178	217.979	3.206	185.247	E
9	6	5	9"	6'-8"	1'-1/2"	4'-3"	1'-5 1/8"	0'-11 5/8"	29'-4"	3'-5"	30'-10"	116	40	110.980	3.709	398.624	31'-2"	6	30'-10"	2	14	3.389	231.784	3.392	185.247	I
9	8	5	8"	6'-8"	1'-1/2"	4'-3"	1'-5 1/8"	0'-11 5/8"	29'-4"	3'-5"	30'-10"	116	56	116.628	3.900	480.975	31'-2"	6	30'-10"	2	18	3.599	245.589	3.577	185.247	M
9	10	5	8"	6'-9"	1'-1/2"	4'-3"	1'-5 1/8"	0'-11 5/8"	29'-6"	3'-5"	31'-0"	116	72	122.276	4.171	546.825	31'-2"	6	30'-10"	2	22	3.809	259.395	3.763	185.247	Q
9	12	6	9"	6'-11"	1'-3/4"	4'-3"	1'-5 1/4"	0'-11 3/4"	29'-10"	3'-5"	31'-5"	116	88	127.924	4.597	702.070	31'-2"	6	30'-10"	2	26	3.979	273.200	3.907	185.247	U
10	4	6	9"	7'-4"	1'-2 1/4"	4'-8"	1'-7 3/8"	1'-1 1/4"	32'-3"	3'-9"	34'-1"	128	24	115.352	4.159	539.178	34'-2"	6	33'-10"	2	10	3.261	236.003	3.299	203.271	E
10	6	6	9"	7'-4"	1'-2 1/4"	4'-8"	1'-7 3/8"	1'-1 1/4"	32'-3"	3'-9"	34'-1"	128	40	121.000	4.355	557.259	34'-2"	6	33'-10"	2	14	3.471	249.808	3.484	203.271	I
10	8	6	9"	7'-4"	1'-2 1/4"	4'-8"	1'-7 3/8"	1'-1 1/4"	32'-3"	3'-9"	34'-1"	128	56	126.648	4.549	604.709	34'-2"	6	33'-10"	2	18	3.681	263.613	3.670	203.271	M
10	10	6	9"	7'-5"	1'-2 1/2"	4'-8"	1'-7 3/4"	1'-1 1/2"	32'-6"	3'-9"	34'-3"	128	72	132.296	4.872	673.407	34'-2"	6	33'-10"	2	22	3.871	277.419	3.835	203.271	Q
10	12	6	9"	7'-7"	1'-2 1/2"	4'-8"	1'-7 3/4"	1'-1 1/2"	32'-9"	3'-9"	34'-7"	128	88	137.944	5.262	748.499	34'-2"	6	33'-10"	2	26	4.036	291.224	3.974	203.271	U
12	6	6	8"	8'-9"	1'-5 1/2"	5'-5"	2'-0"	1'-4 1/2"	38'-3"	4'-6"	40'-6"	152	40	141.040	5.794	714.963	40'-2"	6	39'-10"	2	14	3.583	285.856	3.616	239.319	J
12	8	6	8"	8'-9"	1'-5 1/2"	5'-5"	2'-0"	1'-4 1/2"	38'-3"	4'-6"	40'-6"	152	56	146.688	5.988	768.946	40'-2"	6	39'-10"	2	18	3.793	299.661	3.801	239.319	N
12	10	6	8"	8'-9"	1'-5 1/2"	5'-5"	2'-0"	1'-4 1/2"	38'-4"	4'-6"	40'-7"	152	72	152.336	6.222	839.825	40'-2"	6	39'-10"	2	22	4.003	313.467	3.987	239.319	R
12	12	6	8"	8'-11"	1'-5 3/4"	5'-5"	2'-3/8"	1'-4 3/4"	38'-9"	4'-5"	41'-1"	152	88	157.984	6.722	893.420	40'-2"	6	39'-10"	2	26	4.141	327.272	4.099	239.319	V

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h2>TRIPLE BOX CULVERTS</h2> <h3>20 TO 30 FT. FILLS</h3> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS

DIMENSIONS						REINFORCING STEEL																										
SPAN	HGHT	T1	T2	T3	T4	BH1		BH2		BH3		BH4			BV1		BV2															
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	8"	9	9'-0"	9	9'-0"	1	1'-0"	4	12"	10'-3"	4	12"	11'-4"	4	12"	2'-2"	4'-0"	4	12"	2'-4"	2'-8"	4'-9"	4	12"	4'-0"	4	12"	4'-0"
3	4	8"	8"	8"	8"	9	9'-0"	9	9'-0"	2	2'-0"	4	12"	10'-3"	4	12"	11'-4"	3	12"	2'-4"	4'-5"	4	12"	2'-4"	3'-2"	5'-3"	4	12"	5'-0"	4	12"	5'-0"
4	3	9 3/4"	9 3/4"	8"	8"	12	12'-0"	12	12'-0"	1	1'-0"	4	12"	13'-3"	4	12"	14'-4"	--	--	--	--	4	12"	2'-4"	2'-10"	4'-11"	4	12"	4'-3"	4	12"	4'-3"
4	4	9 3/4"	9 3/4"	8"	8"	12	12'-0"	12	12'-0"	2	2'-0"	4	12"	13'-3"	4	12"	14'-4"	--	--	--	--	4	12"	2'-4"	3'-4"	5'-5"	4	12"	5'-3"	4	12"	5'-3"
4	5	9 3/4"	9 3/4"	8"	8"	12	12'-0"	12	12'-0"	3	3'-0"	4	12"	13'-3"	4	12"	14'-4"	--	--	--	--	4	12"	2'-4"	3'-10"	5'-11"	4	12"	6'-3"	4	12"	6'-3"
4	6	9 3/4"	9 3/4"	8"	8"	12	12'-0"	12	12'-0"	4	4'-0"	4	12"	13'-3"	4	12"	14'-4"	4	12"	2'-11"	5'-6"	4	12"	2'-4"	4'-4"	6'-5"	5	12"	7'-3"	4	12"	7'-3"
5	3	12"	12"	8"	8"	15	15'-0"	15	15'-0"	1	1'-0"	4	11"	16'-4"	4	11"	17'-3"	--	--	--	--	4	11"	2'-4"	3'-0"	5'-1"	4	12"	4'-8"	4	12"	4'-8"
5	4	12"	12"	8"	8"	15	15'-0"	15	15'-0"	2	2'-0"	4	11"	16'-4"	4	11"	17'-3"	--	--	--	--	4	11"	2'-4"	3'-6"	5'-7"	4	12"	5'-8"	4	12"	5'-8"
5	5	11 3/4"	11 3/4"	8"	8"	15	15'-0"	15	15'-0"	3	3'-0"	4	10"	16'-4"	4	10"	17'-3"	--	--	--	--	4	10"	2'-4"	4'-0"	6'-1"	4	12"	6'-7"	4	12"	6'-7"
5	6	11 3/4"	11 3/4"	8"	8"	15	15'-0"	15	15'-0"	4	4'-0"	4	10"	16'-4"	4	10"	17'-3"	--	--	--	--	4	10"	2'-4"	4'-6"	6'-7"	5	12"	7'-7"	4	12"	7'-7"
5	7	11 3/4"	11 3/4"	8"	8"	15	15'-0"	15	15'-0"	5	5'-0"	4	10"	16'-0"	4	10"	17'-3"	--	--	--	--	5	10"	2'-6"	5'-2"	7'-3"	5	8 1/2"	8'-7"	4	12"	8'-7"
6	4	14"	14"	8"	8"	18	18'-0"	18	18'-0"	2	2'-0"	4	9"	19'-4"	4	9"	20'-3"	--	--	--	--	4	9"	2'-4"	3'-8"	5'-9"	4	12"	6'-0"	4	12"	6'-0"
6	5	14"	14"	8"	8"	18	18'-0"	18	18'-0"	3	3'-0"	4	10"	19'-4"	5	10"	20'-3"	--	--	--	--	4	10"	2'-4"	4'-2"	6'-3"	4	12"	7'-0"	4	12"	7'-0"
6	6	14"	14"	8"	8"	18	18'-0"	18	18'-0"	4	4'-0"	4	10"	19'-4"	5	10"	20'-3"	--	--	--	--	4	10"	2'-4"	4'-8"	6'-9"	5	12"	8'-0"	4	12"	8'-0"
6	7	13 3/4"	13 3/4"	8"	8"	18	18'-0"	18	18'-0"	5	5'-0"	4	10"	19'-4"	5	10"	20'-3"	3	10"	3'-5"	6'-7"	4	10"	2'-4"	5'-2"	7'-3"	5	9"	8'-11"	4	12"	8'-11"
6	8	14"	14"	8 1/2"	8"	18	18'-0"	18	18'-0"	6	6'-0"	4	9"	19'-1"	4	9"	20'-5"	--	--	--	--	5	9"	2'-6"	5'-10"	8'-0"	6	9 1/2"	10'-0"	4	12"	10'-0"
7	4	16"	16"	8"	8"	21	21'-0"	21	21'-0"	2	2'-0"	5	9"	22'-4"	5	9"	23'-3"	--	--	--	--	4	9"	2'-9"	3'-10"	6'-4"	4	12"	6'-4"	4	12"	6'-4"
7	6	15 3/4"	15 3/4"	8"	8"	21	21'-0"	21	21'-0"	4	4'-0"	5	9"	22'-4"	5	9"	23'-3"	--	--	--	--	4	9"	2'-9"	4'-10"	7'-4"	5	12"	8'-3"	4	12"	8'-3"
7	8	15 3/4"	15 3/4"	8"	8"	21	21'-0"	21	21'-0"	6	6'-0"	5	9"	22'-4"	5	9"	23'-3"	4	9"	3'-9"	7'-3"	4	9"	2'-9"	5'-10"	8'-4"	5	6"	10'-3"	4	12"	10'-3"
7	10	15 3/4"	15 3/4"	10 1/2"	8"	21	21'-0"	21	21'-0"	8	8'-0"	5	9"	22'-5"	5	9"	23'-9"	3	9"	4'-2"	8'-2"	5	9"	2'-11"	7'-0"	9'-6"	6	6 1/2"	12'-3"	4	12"	12'-3"
8	4	18 1/2"	18 1/2"	8"	8"	24	24'-0"	24	24'-0"	2	2'-0"	5	8"	25'-4"	5	8"	26'-3"	--	--	--	--	4	8"	2'-9"	4'-1"	6'-6"	4	12"	6'-9"	4	10 1/2"	6'-9"
8	6	18"	18"	8"	8"	24	24'-0"	24	24'-0"	4	4'-0"	5	8"	25'-4"	5	8"	26'-3"	--	--	--	--	4	8"	2'-9"	5'-0"	7'-6"	5	12"	8'-7"	4	10 1/2"	8'-7"
8	8	18"	18"	8"	8"	24	24'-0"	24	24'-0"	6	6'-0"	5	8"	25'-4"	5	8"	26'-3"	3	8"	4'-0"	7'-9"	4	8"	2'-9"	6'-0"	8'-6"	5	6"	10'-7"	4	10 1/2"	10'-7"
8	10	18"	18"	10 1/2"	8"	24	24'-0"	24	24'-0"	8	8'-0"	5	8"	25'-5"	5	8"	26'-9"	3	8"	4'-4"	8'-6"	5	8"	2'-11"	7'-2"	9'-9"	6	9"	12'-7"	4	10 1/2"	12'-7"
9	4	20"	20"	8"	8"	27	27'-0"	27	27'-0"	2	2'-0"	6	9"	28'-4"	6	9"	29'-3"	--	--	--	--	4	9"	3'-2"	4'-2"	7'-1"	4	12"	7'-0"	4	10"	7'-0"
9	6	20"	20"	8"	8"	27	27'-0"	27	27'-0"	4	4'-0"	6	9"	28'-4"	6	9"	29'-3"	--	--	--	--	4	9"	3'-2"	5'-2"	8'-1"	5	12"	9'-0"	4	10"	9'-0"
9	8	19 3/4"	19 3/4"	8"	8"	27	27'-0"	27	27'-0"	6	6'-0"	6	9"	28'-0"	6	9"	29'-3"	--	--	--	--	5	9"	3'-4"	6'-4"	9'-3"	5	6"	10'-11"	4	10"	10'-11"
9	10	20"	20"	10 1/2"	8"	27	27'-0"	27	27'-0"	8	8'-0"	6	9"	28'-2"	6	9"	29'-9"	--	--	--	--	6	9"	3'-5"	7'-6"	10'-6"	6	9"	13'-0"	4	10"	13'-0"
9	12	19 3/4"	19 3/4"	12 1/2"	8"	27	27'-0"	27	27'-0"	10	10'-0"	6	9"	28'-3"	6	9"	30'-0"	--	--	--	--	7	9"	3'-7"	8'-9"	11'-10"	6	5 1/2"	14'-11"	4	10"	14'-11"
10	4	22"	22"	8"	8"	30	30'-0"	30	30'-0"	2	2'-0"	6	9"	31'-3"	6	9"	32'-3"	--	--	--	--	4	9"	3'-2"	4'-5"	7'-3"	4	12"	7'-4"	4	10"	7'-4"
10	6	22"	22"	8"	8"	30	30'-0"	30	30'-0"	4	4'-0"	6	9"	31'-3"	6	9"	32'-3"	--	--	--	--	4	9"	3'-2"	5'-5"	8'-3"	5	12"	9'-3"	4	10"	9'-3"
10	8	22"	22"	8"	8"	30	30'-0"	30	30'-0"	6	6'-0"	6	9"	31'-0"	6	9"	32'-3"	--	--	--	--	5	9"	3'-4"	6'-6"	9'-6"	5	6"	11'-3"	4	10"	11'-3"
10	10	22"	22"	10"	8"	30	30'-0"	30	30'-0"	8	8'-0"	7	9"	31'-1"	6	9"	32'-7"	--	--	--	--	6	9"	4'-1"	7'-8"	11'-4"	4	4"	13'-3"	4	10"	13'-3"
10	12	22 1/4"	22 1/4"	12 1/2"	8"	30	30'-0"	30	30'-0"	10	10'-0"	6	9"	31'-6"	6	9"	33'-0"	3	9"	5'-2"	10'-0"	6	9"	3'-5"	8'-9"	11'-9"	6	7 1/2"	15'-4"	4	10"	15'-4"
12	6	26 1/2"	26 1/2"	8"	8"	36	36'-0"	36	36'-0"	4	4'-0"	6	8"	37'-3"	6	8"	38'-4"	--	--	--	--	4	8"	3'-2"	5'-9"	8'-7"	5	12"	10'-1"	4	9 1/2"	10'-1"
12	8	26 1/2"	26 1/2"	8"	8"	36	36'-0"	36	36'-0"	6	6'-0"	6	8"	37'-3"	6	8"	38'-4"	3	8"	4'-8"	9'-2"	4	8"	3'-2"	6'-9"	9'-7"	6	9"	12'-1"	4	9 1/2"	12'-1"
12	10	26 1/2"	26 1/2"	9"	8"	36	36'-0"	36	36'-0"	8	8'-0"	6	8"	37'-2"	6	8"	38'-6"	3	8"	5'-1"	9'-11"	5	8"	3'-4"	7'-11"	10'-10"	8	11 1/2"	14'-1"	4	9 1/2"	14'-1"
12	12	26 1/2"	26 1/2"	12"	8"	36	36'-0"	36	36'-0"	10	10'-0"	6	8"	37'-8"	6	8"	39'-0"	4	8"	5'-6"	10'-8"	5	8"	3'-4"	8'-11"	11'-10"	7	10"	16'-1"	4	9"	16'-1"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1004.15	07/11

TRIPLE BOX CULVERTS
 30 TO 40 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCT-DT.

BCT-40


SPAN		HCHT		REINFORCING STEEL											QUAN./LF		HEADWALLS							WINGWALL			
(FT.)	(FT.)	SIZE	SPACING c-c	BT1								NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS./LONG. FT)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW1		NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. #4 (CY)		INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. #4 (CY)	OUTLET REINFORCING STEEL (LBS)
				a	b	c	d	e	f	g	LENGTH						HEADWALL LENGTH	SIZE	LENGTH								
3	3	4	12"	2'-7"	0'- 4"	1'-10"	0'- 5/8"	0'- 3/4"	11'-3"	1'-3"	11'-9"	44	16	42.388	0.988	119.117	13'- 2"	6	12'-10"	2	8	1.827	102.932	1.808	77.103	A	
3	4	4	12"	2'-7"	0'- 4"	1'-10"	0'- 5/8"	0'- 3/4"	11'-3"	1'-3"	11'-9"	44	24	45.212	1.087	123.575	13'- 2"	6	12'-10"	2	10	1.932	109.835	1.901	77.103	C	
4	3	4	12"	3'-3"	0'- 5 3/4"	2'-3"	0'- 7/8"	0'- 5"	14'-3"	1'-6"	15'-0"	56	16	52.408	1.294	130.522	16'- 2"	6	15'-10"	2	8	2.104	120.956	2.095	95.127	B	
4	4	4	12"	3'-3"	0'- 5 3/4"	2'-3"	0'- 7/8"	0'- 5"	14'-3"	1'-6"	15'-0"	56	24	55.232	1.392	138.874	16'- 2"	6	15'-10"	2	10	2.209	127.859	2.188	95.127		
4	5	4	12"	3'-3"	0'- 5 3/4"	2'-3"	0'- 7/8"	0'- 5"	14'-3"	1'-6"	15'-0"	56	32	58.056	1.490	147.226	16'- 2"	6	15'-10"	2	12	2.315	134.761	2.280	95.127	F	
4	6	4	12"	3'-3"	0'- 5 3/4"	2'-3"	0'- 7/8"	0'- 5"	14'-3"	1'-6"	15'-0"	56	40	60.880	1.587	175.546	16'- 2"	6	15'-10"	2	14	2.420	141.664	2.373	95.127	H	
5	3	4	11"	3'-10"	0'- 8"	2'-8"	0'- 10 1/8"	0'- 7/4"	17'-4"	1'-9"	18'-3"	68	16	62.428	1.718	160.509	19'- 2"	6	18'-10"	2	8	2.313	138.980	2.313	113.151	B	
5	4	4	11"	3'-10"	0'- 8"	2'-8"	0'- 10 1/8"	0'- 7/4"	17'-4"	1'-9"	18'-3"	68	24	65.252	1.816	168.982	19'- 2"	6	18'-10"	2	10	2.418	145.883	2.406	113.151	D	
5	5	4	10"	3'-10"	0'- 7 3/4"	2'-8"	0'- 10 1/2"	0'- 7"	17'-4"	1'-9"	18'-3"	68	32	68.076	1.886	186.495	19'- 2"	6	18'-10"	2	12	2.532	152.785	2.508	113.151	F	
5	6	4	10"	3'-10"	0'- 7 3/4"	2'-8"	0'- 10 1/2"	0'- 7"	17'-4"	1'-9"	18'-3"	68	40	70.900	1.984	200.833	19'- 2"	6	18'-10"	2	14	2.637	159.688	2.600	113.151	H	
5	7	4	10"	3'-10"	0'- 7 3/4"	2'-8"	0'- 10 1/2"	0'- 7"	17'-4"	1'-9"	18'-3"	68	48	73.724	2.080	230.967	19'- 2"	6	18'-10"	2	16	2.742	166.591	2.693	113.151	J	
6	4	4	9"	4'-6"	0'-10"	3'-0"	1'- 1 5/8"	0'- 9/4"	20'-4"	2'-1"	21'-7"	80	24	75.272	2.289	215.855	22'- 2"	6	21'-10"	2	10	2.607	163.907	2.605	131.175	D	
6	5	4	10"	4'-6"	0'-10"	3'-0"	1'- 1 5/8"	0'- 9/4"	20'-4"	2'-1"	21'-7"	80	32	78.096	2.387	229.840	22'- 2"	6	21'-10"	2	12	2.712	170.809	2.698	131.175	F	
6	6	4	10"	4'-6"	0'-10"	3'-0"	1'- 1 5/8"	0'- 9/4"	20'-4"	2'-1"	21'-7"	80	40	80.920	2.485	244.460	22'- 2"	6	21'-10"	2	14	2.817	177.712	2.791	131.175	H	
6	7	4	10"	4'-6"	0'-9 3/4"	3'-0"	1'- 1 1/4"	0'- 9"	20'-4"	2'-1"	21'-6"	80	48	83.744	2.550	271.576	22'- 2"	6	21'-10"	2	16	2.922	184.615	2.883	131.175	J	
6	8	4	9"	4'-7"	0'-10"	3'-0"	1'- 1 5/8"	0'- 9/4"	20'-5"	2'-1"	21'-8"	80	56	86.568	2.711	292.291	22'- 2"	6	21'-10"	2	18	3.039	191.517	2.987	131.175	L	
7	4	5	9"	5'-2"	1'- 0"	3'-5"	1'- 4 3/8"	0'-11 1/8"	23'-4"	2'-4"	24'-10"	92	24	85.292	2.833	314.260	25'- 2"	6	24'-10"	2	10	2.769	181.931	2.777	149.199	E	
7	6	5	9"	5'-2"	0'-11 3/4"	3'-5"	1'- 4"	0'-10 7/8"	23'-4"	2'-5"	24'-9"	92	40	90.940	2.993	337.736	25'- 2"	6	24'-10"	2	14	2.979	195.736	2.962	149.199	I	
7	8	5	9"	5'-2"	0'-11 3/4"	3'-5"	1'- 4"	0'-10 7/8"	23'-4"	2'-5"	24'-9"	92	56	96.588	3.185	404.045	25'- 2"	6	24'-10"	2	18	3.189	209.541	3.148	149.199	M	
7	10	5	9"	5'-5"	0'-11 3/4"	3'-5"	1'- 4"	0'-10 7/8"	23'-9"	2'-5"	25'-2"	92	72	102.236	3.573	457.227	25'- 2"	6	24'-10"	2	22	3.361	223.347	3.294	149.199	Q	
8	4	5	8"	5'-9"	1'- 2 1/2"	3'-10"	1'- 7/8"	1'- 1 5/8"	26'-4"	2'-6"	28'-2"	104	24	95.312	3.536	383.895	28'- 2"	6	27'-10"	2	10	2.875	199.955	2.893	167.223	E	
8	6	5	8"	5'-9"	1'- 2"	3'-10"	1'- 7/8"	1'- 1 5/8"	26'-4"	2'-7"	28'-1"	104	40	100.960	3.649	408.450	28'- 2"	6	27'-10"	2	14	3.085	213.760	3.079	167.223	I	
8	8	5	8"	5'-9"	1'- 2"	3'-10"	1'- 7/8"	1'- 1 5/8"	26'-4"	2'-7"	28'-1"	104	56	106.608	3.842	468.303	28'- 2"	6	27'-10"	2	18	3.280	227.565	3.248	167.223	M	
8	10	5	8"	6'-0"	1'- 2"	3'-10"	1'- 7/8"	1'- 1 5/8"	26'-9"	2'-7"	28'-6"	104	72	112.256	4.236	518.258	28'- 2"	6	27'-10"	2	22	3.451	241.371	3.394	167.223	Q	
9	4	6	9"	6'-5"	1'- 4"	4'-3"	1'- 9/8"	1'- 3"	29'-4"	2'-11"	31'-4"	116	24	105.332	4.144	499.880	31'- 2"	6	30'-10"	2	10	2.944	217.979	2.972	185.247	E	
9	6	6	9"	6'-5"	1'- 4"	4'-3"	1'- 9/8"	1'- 3"	29'-4"	2'-11"	31'-4"	116	40	110.980	4.340	525.293	31'- 2"	6	30'-10"	2	14	3.155	231.784	3.158	185.247	I	
9	8	6	9"	6'-5"	1'- 3 3/4"	4'-3"	1'- 9/2"	1'- 2 3/4"	29'-4"	2'-11"	31'-4"	116	56	116.628	4.487	586.121	31'- 2"	6	30'-10"	2	18	3.365	245.589	3.343	185.247	M	
9	10	6	9"	6'-8"	1'- 4"	4'-3"	1'- 9/8"	1'- 3"	29'-9"	2'-11"	31'-9"	116	72	122.276	4.932	641.784	31'- 2"	6	30'-10"	2	22	3.553	259.395	3.506	185.247	Q	
9	12	6	9"	6'-10"	1'- 3 3/4"	4'-3"	1'- 9/2"	1'- 2 3/4"	30'-1"	2'-11"	32'-1"	116	88	127.924	5.294	747.331	31'- 2"	6	30'-10"	2	26	3.598	273.200	3.525	185.247	U	
10	4	6	9"	7'-1"	1'- 6"	4'-8"	2'- 3/4"	1'- 5"	32'-3"	3'-2"	34'-7"	128	24	115.352	4.914	547.156	34'- 2"	6	33'-10"	2	10	2.975	236.003	3.013	203.271	F	
10	6	6	9"	7'-1"	1'- 6"	4'-8"	2'- 3/4"	1'- 5"	32'-3"	3'-2"	34'-7"	128	40	121.000	5.110	572.819	34'- 2"	6	33'-10"	2	14	3.185	249.808	3.198	203.271	J	
10	8	6	9"	7'-1"	1'- 6"	4'-8"	2'- 3/4"	1'- 5"	32'-3"	3'-2"	34'-7"	128	56	126.648	5.302	635.237	34'- 2"	6	33'-10"	2	18	3.395	263.613	3.384	203.271	N	
10	10	7	9"	7'-3"	1'- 6"	4'-8"	2'- 3/8"	1'- 4 5/4"	32'-7"	3'-2"	34'-11"	128	72	132.296	5.657	790.481	34'- 2"	6	33'-10"	2	22	3.564	277.419	3.527	203.271	R	
10	12	6	9"	7'-5"	1'- 6 1/4"	4'-8"	2'- 1/8"	1'- 5 1/4"	33'-0"	3'-1"	35'-5"	128	88	137.944	6.175	756.073	34'- 2"	6	33'-10"	2	26	3.603	291.224	3.540	203.271	V	
12	6	6	8"	8'-4"	1'-10 1/2"	5'-5"	2'- 7/8"	1'- 9/2"	38'-3"	3'-8"	41'-3"	152	40	141.040	6.986	732.789	40'- 2"	6	39'-10"	2	14	3.184	285.856	3.217	239.319	J	
12	8	6	8"	8'-4"	1'-10 1/2"	5'-5"	2'- 7/8"	1'- 9/2"	38'-3"	3'-8"	41'-3"	152	56	146.688	7.179	797.422	40'- 2"	6	39'-10"	2	18	3.394	299.661	3.402	239.319	N	
12	10	6	8"	8'-5"	1'-10 1/2"	5'-5"	2'- 7/8"	1'- 9/2"	38'-6"	3'-8"	41'-5"	152	72	152.336	7.460	872.364	40'- 2"	6	39'-10"	2	22	3.535	313.467	3.518	239.319	R	
12	12	6	8"	8'-8"	1'-10 1/2"	5'-5"	2'- 7/8"	1'- 9/2"	39'-0"	3'-8"	41'-11"	152	88	157.984	7.970	921.845	40'- 2"	6	39'-10"	2	26	3.590	327.272	3.547	239.319	V	

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SPECIFICATION REFERENCE	<h2>TRIPLE BOX CULVERTS</h2> <h3>30 TO 40 FT. FILLS</h3> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	REVISION DATE	SHEET 2 OF 2
			07/11	1004.16

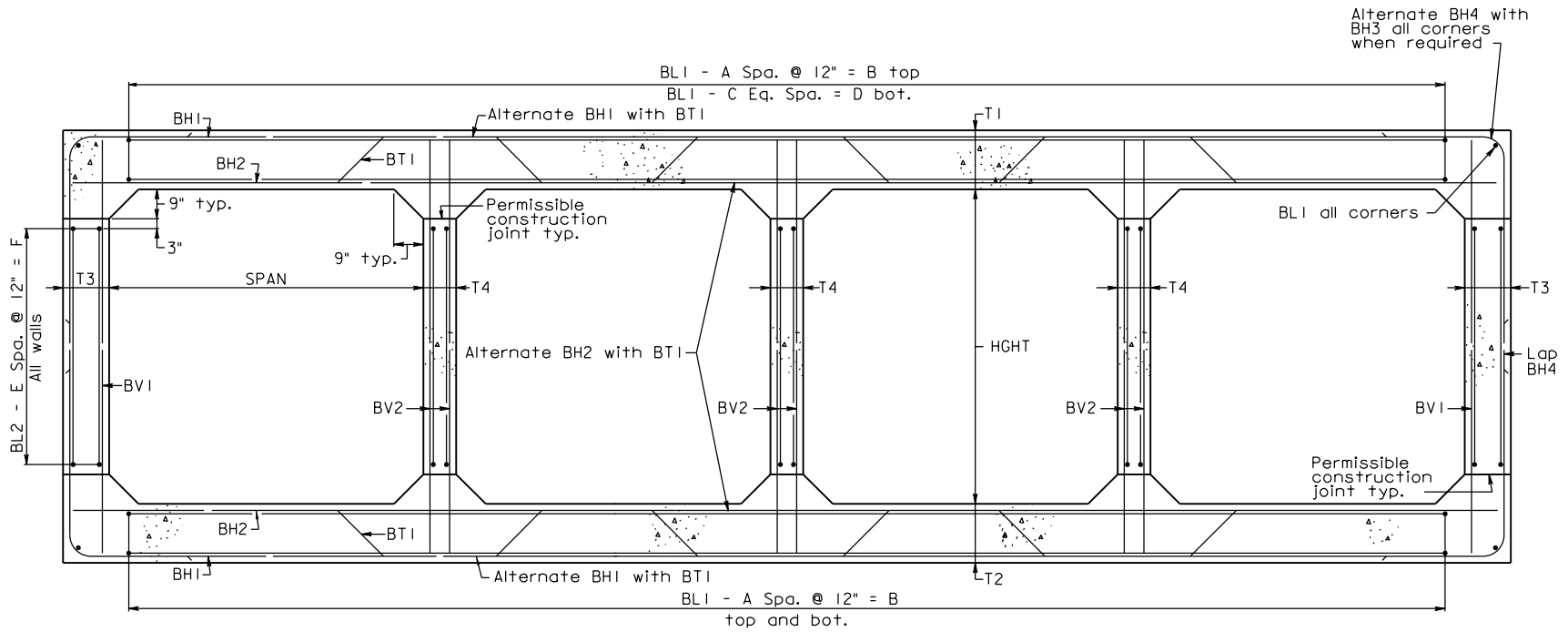
DIMENSIONS						REINFORCING STEEL																										
SPAN	HGHT	T1	T2	T3	T4							BH1			BH2			BH3			BH4			BV1			BV2					
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	9"	9"	8"	8"	9	9'-0"	9	9'-0"	1	1'-0"	4	12"	10'-3"	4	12"	11'-4"	--	---	----	----	4	12"	2'-4"	2'-9"	4'-10"	4	12"	4'-2"	4	12"	4'-2"
3	4	9"	9"	8"	8"	9	9'-0"	9	9'-0"	2	2'-0"	4	12"	10'-3"	4	12"	11'-4"	--	---	----	----	4	12"	2'-4"	3'-3"	5'-4"	4	12"	5'-2"	4	12"	5'-2"
4	3	11"	11"	8"	8"	12	12'-0"	12	12'-0"	1	1'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	2'-11"	5'-0"	4	12"	4'-6"	4	12"	4'-6"
4	4	11 1/4"	11 1/4"	8"	8"	12	12'-0"	12	12'-0"	2	2'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	3'-6"	5'-6"	4	12"	5'-6"	4	12"	5'-6"
4	5	11"	11"	8"	8"	12	12'-0"	12	12'-0"	3	3'-0"	4	12"	13'-3"	4	12"	14'-4"	--	---	----	----	4	12"	2'-4"	3'-11"	6'-0"	5	12"	6'-6"	4	12"	6'-6"
4	6	11 1/4"	11 1/4"	8"	8"	12	12'-0"	12	12'-0"	4	4'-0"	4	12"	13'-3"	4	12"	14'-4"	4	12"	3'-0"	5'-9"	4	12"	2'-4"	4'-6"	6'-6"	5	9"	7'-6"	4	12"	7'-6"
5	3	13 1/2"	13 1/2"	8"	8"	15	15'-0"	15	15'-0"	1	1'-0"	4	9"	16'-4"	4	9"	17'-3"	--	---	----	----	4	9"	2'-4"	3'-2"	5'-2"	4	12"	4'-11"	4	12"	4'-11"
5	4	13 1/2"	13 1/2"	8"	8"	15	15'-0"	15	15'-0"	2	2'-0"	4	9"	16'-4"	4	9"	17'-3"	--	---	----	----	4	9"	2'-4"	3'-8"	5'-8"	4	12"	5'-11"	4	12"	5'-11"
5	5	13 1/2"	13 1/2"	8"	8"	15	15'-0"	15	15'-0"	3	3'-0"	4	9"	16'-4"	4	9"	17'-3"	--	---	----	----	4	9"	2'-4"	4'-2"	6'-2"	5	12"	6'-11"	4	12"	6'-11"
5	6	13 1/2"	13 1/2"	8"	8"	15	15'-0"	15	15'-0"	4	4'-0"	4	9"	16'-4"	4	9"	17'-3"	--	---	----	----	4	9"	2'-4"	4'-8"	6'-8"	5	9 1/2"	7'-11"	4	12"	7'-11"
5	7	13 1/2"	13 1/2"	8 1/2"	8"	15	15'-0"	15	15'-0"	5	5'-0"	4	10"	16'-1"	4	10"	17'-5"	--	---	----	----	5	10"	2'-6"	5'-4"	7'-5"	6	10 1/2"	8'-11"	4	12"	8'-11"
6	4	16 1/2"	16 1/2"	8"	8"	18	18'-0"	18	18'-0"	2	2'-0"	4	9"	19'-4"	5	9"	20'-3"	--	---	----	----	4	9"	2'-4"	3'-11"	5'-11"	4	12"	6'-5"	4	11"	6'-5"
6	5	16"	16"	8"	8"	18	18'-0"	18	18'-0"	3	3'-0"	4	9"	19'-4"	5	9"	20'-3"	--	---	----	----	4	9"	2'-4"	4'-4"	6'-5"	5	12"	7'-4"	4	11"	7'-4"
6	6	16"	16"	8"	8"	18	18'-0"	18	18'-0"	4	4'-0"	4	9"	19'-4"	5	9"	20'-3"	--	---	----	----	4	9"	2'-4"	4'-10"	6'-11"	5	10"	8'-3"	4	11 1/2"	8'-3"
6	7	16"	16"	8"	8"	18	18'-0"	18	18'-0"	5	5'-0"	4	9"	19'-4"	5	9"	20'-3"	3	9"	3'-7"	7'-0"	4	9"	2'-4"	5'-4"	7'-5"	6	10 1/2"	9'-3"	4	11 1/2"	9'-3"
6	8	16"	16"	9 1/2"	8"	18	18'-0"	18	18'-0"	6	6'-0"	4	9"	19'-3"	5	9"	20'-6"	--	---	----	----	5	9"	2'-6"	6'-0"	8'-2"	5	5"	10'-3"	4	11 1/2"	10'-3"
7	4	18 1/2"	18 1/2"	8"	8"	21	21'-0"	21	21'-0"	2	2'-0"	5	9"	22'-4"	5	9"	23'-3"	--	---	----	----	4	9"	2'-9"	4'-1"	6'-6"	4	12"	6'-9"	4	10"	6'-9"
7	6	18 1/2"	18 1/2"	8"	8"	21	21'-0"	21	21'-0"	4	4'-0"	5	9"	22'-4"	5	9"	23'-3"	--	---	----	----	4	9"	2'-9"	5'-1"	7'-6"	5	9 1/2"	8'-9"	4	10"	8'-9"
7	8	18"	18"	9 1/2"	8"	21	21'-0"	21	21'-0"	6	6'-0"	5	9"	22'-3"	5	9"	23'-6"	--	---	----	----	5	9"	2'-11"	6'-2"	8'-9"	5	7 1/2"	10'-7"	4	10"	10'-7"
7	10	18"	18"	11 1/2"	8"	21	21'-0"	21	21'-0"	8	8'-0"	5	9"	22'-7"	5	9"	23'-11"	4	9"	4'-4"	8'-5"	5	9"	2'-11"	7'-2"	9'-9"	7	9"	12'-7"	4	10"	12'-7"
8	4	21"	21"	8"	8"	24	24'-0"	24	24'-0"	2	2'-0"	6	9"	25'-4"	6	9"	26'-3"	--	---	----	----	4	9"	3'-2"	4'-3"	7'-2"	4	12"	7'-2"	4	10"	7'-2"
8	6	21"	21"	8"	8"	24	24'-0"	24	24'-0"	4	4'-0"	5	8"	25'-4"	5	8"	26'-3"	--	---	----	----	4	8"	2'-9"	5'-3"	7'-9"	5	9"	9'-1"	4	10"	9'-1"
8	8	20 1/2"	20 1/2"	8 1/2"	8"	24	24'-0"	24	24'-0"	6	6'-0"	5	8"	25'-5"	5	8"	26'-5"	3	8"	4'-2"	8'-2"	4	8"	2'-9"	6'-3"	8'-8"	6	7 1/2"	11'-0"	4	10"	11'-0"
8	10	20 1/2"	20 1/2"	11 1/2"	8"	24	24'-0"	24	24'-0"	8	8'-0"	5	8"	25'-7"	5	8"	26'-11"	3	8"	4'-7"	8'-11"	5	8"	2'-11"	7'-5"	9'-11"	7	9"	13'-0"	4	10"	13'-0"
9	4	23"	23"	8"	8"	27	27'-0"	27	27'-0"	2	2'-0"	6	9"	28'-4"	6	9"	29'-3"	--	---	----	----	4	9"	3'-2"	4'-5"	7'-4"	4	12"	7'-6"	4	10"	7'-6"
9	6	23"	23"	8"	8"	27	27'-0"	27	27'-0"	4	4'-0"	6	9"	28'-4"	6	9"	29'-3"	--	---	----	----	4	9"	3'-2"	5'-5"	8'-4"	5	8 1/2"	9'-6"	4	10"	9'-6"
9	8	23"	23"	8 1/2"	8"	27	27'-0"	27	27'-0"	6	6'-0"	6	9"	28'-1"	6	9"	29'-5"	--	---	----	----	5	9"	3'-4"	6'-8"	9'-7"	5	4 1/2"	11'-6"	4	10"	11'-6"
9	10	23"	23"	11 1/2"	8"	27	27'-0"	27	27'-0"	8	8'-0"	6	9"	28'-4"	6	9"	29'-11"	--	---	----	----	6	9"	3'-5"	7'-9"	10'-9"	5	4"	13'-6"	4	10"	13'-6"
9	12	23"	23"	14"	8"	27	27'-0"	27	27'-0"	10	10'-0"	6	9"	28'-6"	6	9"	30'-3"	3	9"	5'-2"	10'-2"	7	9"	3'-7"	9'-0"	12'-1"	6	7"	15'-6"	4	9 1/2"	15'-6"
10	4	26"	26"	8"	8"	30	30'-0"	30	30'-0"	2	2'-0"	6	9"	31'-3"	6	9"	32'-3"	--	---	----	----	4	9"	3'-2"	4'-8"	7'-7"	4	12"	8'-0"	4	9"	8'-0"
10	6	25 1/2"	25 1/2"	8"	8"	30	30'-0"	30	30'-0"	4	4'-0"	6	9"	31'-3"	6	9"	32'-3"	--	---	----	----	4	9"	3'-2"	5'-8"	8'-6"	5	8"	9'-11"	4	9"	9'-11"
10	8	25 1/2"	25 1/2"	8"	8"	30	30'-0"	30	30'-0"	6	6'-0"	6	9"	31'-3"	6	9"	32'-3"	3	9"	4'-7"	9'-0"	4	9"	3'-2"	6'-8"	9'-6"	5	4 1/2"	11'-11"	4	9"	11'-11"
10	10	25 1/2"	25 1/2"	11"	8"	30	30'-0"	30	30'-0"	8	8'-0"	6	9"	31'-6"	6	9"	32'-9"	3	9"	5'-0"	9'-9"	5	9"	3'-4"	7'-10"	10'-9"	6	6"	13'-11"	4	9"	13'-11"
10	12	25 1/2"	25 1/2"	14"	8"	30	30'-0"	30	30'-0"	10	10'-0"	6	9"	31'-9"	6	9"	33'-3"	3	9"	5'-5"	10'-7"	6	9"	3'-5"	9'-0"	12'-0"	8	9 1/2"	15'-11"	4	9"	15'-11"
12	6	30 1/2"	30 1/2"	8"	8"	36	36'-0"	36	36'-0"	4	4'-0"	7	9"	37'-3"	7	9"	38'-4"	--	---	----	----	4	9"	3'-10"	6'-1"	9'-7"	5	7 1/2"	10'-8"	4	12"	10'-8"
12	8	30 1/2"	30 1/2"	8"	8"	36	36'-0"	36	36'-0"	6	6'-0"	7	9"	37'-3"	7	9"	38'-4"	3	9"	5'-0"	9'-10"	4	9"	3'-10"	7'-1"	10'-7"	7	9 1/2"	12'-8"	4	12"	12'-8"
12	10	30 1/2"	30 1/2"	9 3/4"	8"	36	36'-0"	36	36'-0"	8	8'-0"	7	8"	37'-4"	7	8"	38'-7"	3	8"	5'-5"	10'-7"	5	8"	4'-0"	8'-3"	11'-10"	7	8"	14'-8"	4	7 1/2"	14'-8"
12	12	30 1/2"	30 1/2"	13"	8"	36	36'-0"	36	36'-0"	10	10'-0"	7	8"	37'-7"	7	8"	39'-1"	3	8"	5'-10"	11'-5"	6	8"	4'-1"	9'-5"	13'-1"	8	9 1/2"	16'-9"	4	7 1/2"	16'-9"

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 ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1004.17	07/11

TRIPLE BOX CULVERTS
40 TO 50 FT. FILLS
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE



TYPICAL SECTION

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ROAD AND BRIDGE STANDARDS

QUADRUPLE BOX CULVERTS
STANDARD DETAILS

SPECIFICATION
REFERENCE

SHEET 1 OF 3

REVISION DATE

VIRGINIA DEPARTMENT OF TRANSPORTATION

1005.01

07/11

GENERAL NOTE

Capacity: AASHTO HI-93 Loading.

Specifications:

Construction - Virginia Department of Transportation Road and Bridge Specifications 2007.

Design - AASHTO LRFD Bridge Design Specifications, 4th Edition 2007; 2008 and 2009 Interim Specifications; and VDOT Modifications.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Construction joints shall be constructed and bonded in accordance with the current Road and Bridge Specifications.

Barrels more than 35' in length shall be poured in sections by providing vertical construction joints, not exceeding 25' between joints nor more than 30' from ends of barrels.

** All bends shall be made with a pin diameter as listed in TABLE A except for Bars BH3 and BH4 which shall have a pin diameter of 24 bar diameters.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight and #4 size unless otherwise shown. BL2 shall be #3 size.

The number of BL1 and BL2 bars shown in the table is the number of longitudinal bars shown in the Typical Section and may not equal the total number of bars required. BL1 and BL2 shall have a lap of 30 bar diameters at splices. At construction joints, first placed bars shall project 30 bar diameters beyond the joint. Estimated QUAN./LF shown for reinforcing steel does not include quantity for laps of BL1 and BL2 bars. The additional weight per longitudinal lap is shown in the table.

The minimum cover of main reinforcing bars shall be 2 1/2" from the face of the concrete for culverts under 0 to 2 foot fills and shall be 2" from the face of concrete for all other culverts.

All reinforcing steel for culverts under 0 to 2 foot fills shall be Low Carbon/Chromium Reinforcing Steel conforming to ASTM A1035.

At the Contractor's option, BV1 and BV2 bars may be spliced at the permissible construction joint in order to facilitate construction. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Bar HW2 shall be 4" less than culvert height in length.

Headwall quantities shown assume wingwalls are to be built at a 45° angle to the headwall.

The designs are applicable to the fill height and other conditions indicated. Any change in the conditions invalidates these designs.

Wingwalls referenced by letter apply when the acceptable foundation level is the same for both box and wings. If foundation levels are different, the height of the wingwall shall be adjusted by selection of another lettered wingwall of appropriate height. For wingwall details, refer to standard series BCW for the appropriate fill slope.

For details of extending existing boxes, refer to Standard BCE-01.

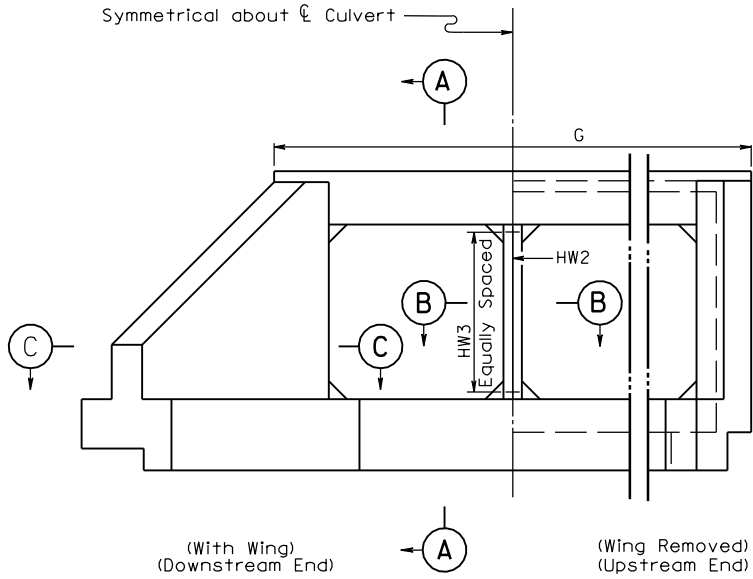
For modification of details for skewed culverts, see the skewed box details included in the road plans.

This standard shall be used with the BCQ standard series.

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION REFERENCE	<h2 style="margin: 0;">QUADRUPLE BOX CULVERTS</h2> <h3 style="margin: 0;">STANDARD DETAILS</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE	SHEET 2 OF 3
		07/11	1005.02

Symmetrical about ℓ Culvert



END ELEVATION

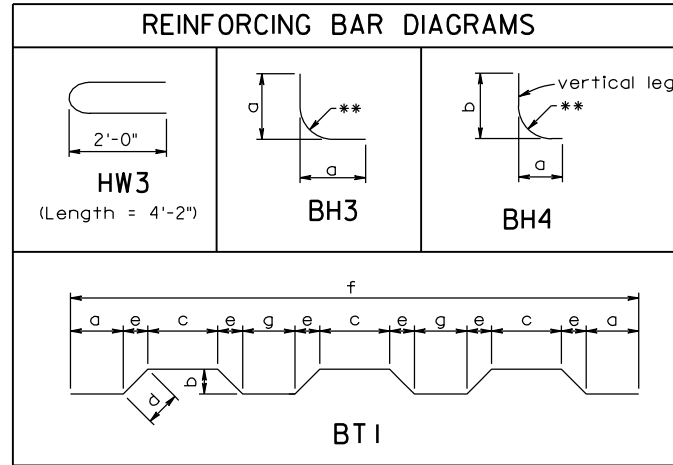
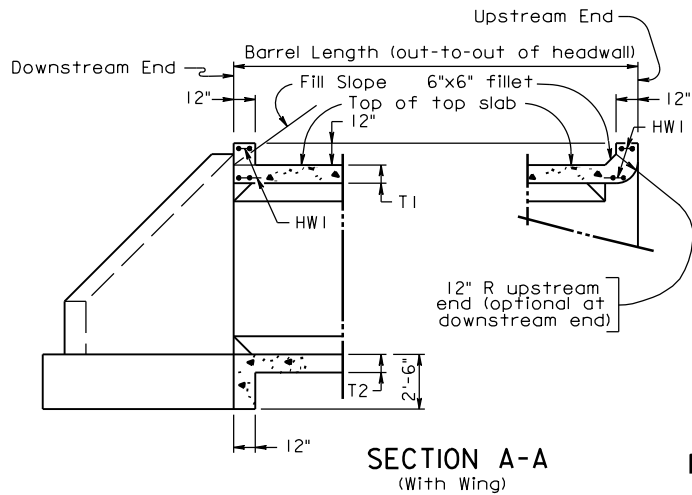
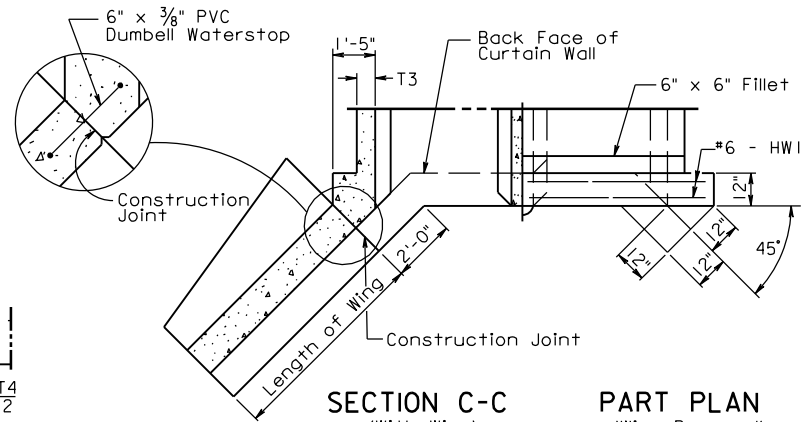
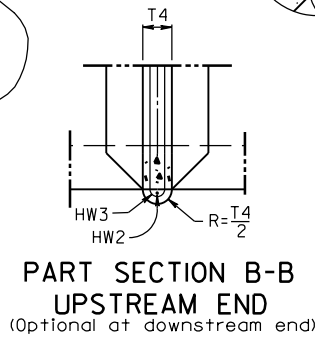


TABLE A	
Bar Size	Pin Dia.
#3	2 1/4"
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"
#9	9"



SECTION A-A
(With Wing)



SECTION C-C
(With Wing)
(Downstream End)

PART PLAN
(Wing Removed)
(Upstream End)



ROAD AND BRIDGE STANDARDS

SHEET 3 OF 3

REVISION DATE

1005.03

07/11

QUADRUPLE BOX CULVERTS

STANDARD DETAIL

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

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SPECIFICATION
REFERENCE

QUADRUPLE BOX CULVERTS
STANDARD DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 1 OF 1

07/11

1005.04

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

BCQ-05

SPAN		HGHT		REINFORCING STEEL										QUAN./LF		HEADWALLS								WINGWALL					
(FT.)	(FT.)	SIZE	SPACING C-C	BT I										NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS/LONG. JT)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS/LF)	G		HW I		NO. HW2 BARS		NO. HW3 BARS	INLET CONCRETE CL. #4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. #4 (CY)	OUTLET REINFORCING STEEL (LBS)
				a	b	c	d	e	f	g	LENGTH	HEADWALL LENGTH	SIZE						LENGTH										
3	3	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 7/8"	15'- 9"	60	20	57.160	1.284	141.899	16'- 10"	6	16'- 6"	3	12	2.222	137.876	2.191	99.132	A			
3	4	4	12"	2'- 8 7/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 7/8"	15'- 9"	60	30	60.690	1.406	152.339	16'- 10"	6	16'- 6"	3	15	2.333	148.230	2.284	99.132	C			
4	3	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	20	70.520	1.479	168.508	20'- 10"	6	20'- 6"	3	12	2.626	161.908	2.609	123.164	A			
4	4	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	30	74.050	1.601	190.527	20'- 10"	6	20'- 6"	3	15	2.738	172.262	2.702	123.164	C			
4	5	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	40	77.580	1.723	209.164	20'- 10"	6	20'- 6"	3	18	2.849	182.616	2.794	123.164	E			
4	6	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	50	81.110	1.845	223.366	20'- 10"	6	20'- 6"	3	21	2.960	192.970	2.887	123.164	G			
5	3	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	20	83.880	1.674	208.031	24'- 10"	6	24'- 6"	3	12	3.031	185.940	3.027	147.196	A			
5	4	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	30	87.410	1.796	222.479	24'- 10"	6	24'- 6"	3	15	3.142	196.294	3.120	147.196	C			
5	5	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	40	90.940	1.919	233.721	24'- 10"	6	24'- 6"	3	18	3.254	206.648	3.212	147.196	E			
5	6	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	50	94.470	2.041	253.896	24'- 10"	6	24'- 6"	3	21	3.365	217.002	3.305	147.196	G			
5	7	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	60	98.000	2.163	267.779	24'- 10"	6	24'- 6"	3	24	3.476	227.356	3.398	147.196				
6	4	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	30	100.770	1.991	254.634	28'- 10"	6	28'- 6"	3	15	3.547	220.326	3.537	171.228	C			
6	5	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	40	104.300	2.113	271.240	28'- 10"	6	28'- 6"	3	18	3.658	230.680	3.630	171.228	E			
6	6	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	50	107.830	2.236	287.643	28'- 10"	6	28'- 6"	3	21	3.770	241.034	3.723	171.228	G			
6	7	4	11"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	60	111.360	2.357	315.391	28'- 10"	6	28'- 6"	3	24	3.881	251.388	3.816	171.228				
6	8	4	11"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	70	114.890	2.478	348.013	28'- 10"	6	28'- 6"	3	27	3.992	261.742	3.908	171.228	K			
7	4	4	8"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	30	114.130	2.179	375.974	32'- 10"	6	32'- 6"	3	15	3.952	244.358	3.955	195.260	C			
7	6	4	8"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	50	121.190	2.424	411.704	32'- 10"	6	32'- 6"	3	21	4.174	265.066	4.141	195.260	G			
7	8	4	8"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	70	128.250	2.668	446.891	32'- 10"	6	32'- 6"	3	27	4.397	285.774	4.326	195.260	K			
7	10	4	8"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	90	135.310	2.912	490.787	32'- 10"	6	32'- 6"	3	33	4.620	306.482	4.512	195.260	O			
8	4	5	10"	6'- 8 7/8"	0'- 4 7/8"	3'- 6 3/8"	0'- 6"	0'- 3 3/4"	34'- 11 7/8"	4'- 5 7/8"	35'- 9"	140	30	127.490	2.370	469.730	36'- 10"	6	36'- 6"	3	15	4.356	268.390	4.373	219.292	C			
8	6	5	11"	6'- 8 3/4"	0'- 4 7/8"	3'- 6 3/8"	0'- 6 1/4"	0'- 4"	34'- 11 7/8"	4'- 5 5/8"	35'- 9"	140	50	134.550	2.670	482.589	36'- 10"	6	36'- 6"	3	21	4.557	289.098	4.536	219.292	G			
8	8	5	11"	6'- 8 3/4"	0'- 4 7/8"	3'- 6 3/8"	0'- 6 1/4"	0'- 4"	34'- 11 7/8"	4'- 5 5/8"	35'- 9"	140	70	141.610	2.910	573.014	36'- 10"	6	36'- 6"	3	27	4.779	309.806	4.722	219.292	K			
8	10	5	10"	6'- 8 5/8"	0'- 5 1/8"	3'- 6 1/8"	0'- 6 5/8"	0'- 4 1/4"	34'- 11 7/8"	4'- 5 3/8"	35'- 10"	140	90	148.670	3.210	593.975	36'- 10"	6	36'- 6"	3	33	4.980	330.514	4.885	219.292	O			
9	4	5	9"	7'- 6 1/4"	0'- 5 1/8"	3'- 11"	0'- 6 5/8"	0'- 4 1/4"	39'- 0"	5'- 1/2"	39'- 10"	156	30	140.850	2.683	551.081	40'- 10"	6	40'- 6"	3	15	4.710	292.422	4.740	243.324	C			
9	6	5	9"	7'- 6 1/4"	0'- 5 1/8"	3'- 11"	0'- 6 5/8"	0'- 4 1/4"	39'- 0"	5'- 1/2"	39'- 10"	156	50	147.910	2.927	589.585	40'- 10"	6	40'- 6"	3	21	4.933	313.130	4.926	243.324	G			
9	8	5	9"	7'- 6 1/4"	0'- 5 1/8"	3'- 11"	0'- 6 5/8"	0'- 4 1/4"	39'- 0"	5'- 1/2"	39'- 10"	156	70	154.970	3.171	624.975	40'- 10"	6	40'- 6"	3	27	5.156	333.838	5.111	243.324	K			
9	10	5	9"	7'- 6"	0'- 5 5/8"	3'- 10 1/2"	0'- 7 3/8"	0'- 4 3/4"	39'- 0"	5'- 0"	40'- 0"	156	90	162.030	3.536	665.872	40'- 10"	6	40'- 6"	3	33	5.327	354.546	5.246	243.324	O			
9	12	6	12"	7'- 6"	0'- 5 3/4"	3'- 10 1/2"	0'- 7 1/2"	0'- 4 3/4"	39'- 0"	5'- 0"	39'- 11"	156	110	169.090	3.777	741.709	40'- 10"	6	40'- 6"	3	39	5.550	375.254	5.431	243.324	S			
10	4	6	12"	8'- 3 5/8"	0'- 5 3/4"	4'- 3 1/4"	0'- 7 1/2"	0'- 4 3/4"	43'- 0"	5'- 7 1/4"	43'- 11"	172	30	154.210	3.020	638.478	44'- 10"	6	44'- 6"	3	15	5.052	316.454	5.095	267.356	C			
10	6	6	12"	8'- 3 5/8"	0'- 5 3/4"	4'- 3 1/4"	0'- 7 1/2"	0'- 4 3/4"	43'- 0"	5'- 7 1/4"	43'- 11"	172	50	161.270	3.263	679.789	44'- 10"	6	44'- 6"	3	21	5.274	337.162	5.280	267.356	G			
10	8	5	8"	8'- 3 1/2"	0'- 5 1/8"	4'- 3"	0'- 7 3/4"	0'- 5"	43'- 0"	5'- 7"	44'- 0"	172	70	168.330	3.572	743.548	44'- 10"	6	44'- 6"	3	27	5.487	357.870	5.456	267.356	L			
10	10	6	11"	8'- 3 3/8"	0'- 6 1/4"	4'- 2 3/4"	0'- 8 1/8"	0'- 5 1/4"	43'- 0"	5'- 6 3/4"	44'- 0"	172	90	175.390	3.882	793.552	44'- 10"	6	44'- 6"	3	33	5.681	378.578	5.613	267.356	P			
10	12	6	11"	8'- 3 1/4"	0'- 6 1/2"	4'- 2 1/2"	0'- 8 1/2"	0'- 5 1/2"	43'- 0"	5'- 6 1/2"	44'- 1"	172	110	182.450	4.192	850.755	44'- 10"	6	44'- 6"	3	39	5.875	399.286	5.770	267.356	T			
12	6	6	12"	9'- 10 1/8"	0'- 7 1/4"	4'- 11 3/8"	0'- 9 5/8"	0'- 6 1/4"	51'- 1/8"	6'- 8 1/8"	52'- 3"	204	50	187.990	4.175	782.755	52'- 10"	6	52'- 6"	3	21	5.869	385.226	5.902	315.420	H			
12	8	5	8"	9'- 10 1/4"	0'- 6 7/8"	4'- 11 5/8"	0'- 9 1/8"	0'- 6"	51'- 1/8"	6'- 8 3/8"	52'- 3"	204	70	195.050	4.332	932.213	52'- 10"	6	52'- 6"	3	27	6.127	405.934	6.122	315.420	L			
12	10	6	10"	9'- 10 1/4"	0'- 7"	4'- 11 5/8"	0'- 9 1/4"	0'- 6"	51'- 1/8"	6'- 8 3/8"	52'- 3"	204	90	202.110	4.576	966.832	52'- 10"	6	52'- 6"	3	33	6.349	426.642	6.308	315.420	P			
12	12	6	9"	9'- 10 3/8"	0'- 6 3/4"	4'- 11 7/8"	0'- 8 7/8"	0'- 5 3/4"	51'- 1/8"	6'- 8 5/8"	52'- 2"	204	110	209.170	4.733	1112.599	52'- 10"	6	52'- 6"	3	39	6.607	447.350	6.528	315.420	T			

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SPECIFICATION REFERENCE

QUADRUPLE BOX CULVERTS
2 TO 5 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 2 OF 2

07/11 1005.08

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

DIMENSIONS						REINFORCING STEEL																													
SPAN	HGHT	T1	T2	T3	T4	A	B	C	D	E	F	BH1			BH2			BH3			BH4			BV1			BV2								
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)							SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	1	1'- 0"	4	12"	14'-10"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 1 1/4"	2'- 8"	4'- 6"	4	12"	4'- 0"	4	12"	4'- 0"			
3	4	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	2	2'- 0"	4	12"	14'-10"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 1 1/4"	3'- 2"	5'- 0"	4	12"	5'- 0"	4	12"	5'- 0"			
4	3	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	1	1'- 0"	4	12"	18'- 5"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 3 3/8"	2'- 8"	4'- 8"	4	12"	4'- 0"	4	12"	4'- 0"			
4	4	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	2	2'- 0"	4	12"	18'- 5"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 3 3/8"	3'- 2"	5'- 2"	4	12"	5'- 0"	4	12"	5'- 0"			
4	5	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	3	3'- 0"	4	12"	18'- 5"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 3 3/8"	3'- 8"	5'- 8"	4	12"	6'- 0"	4	12"	6'- 0"			
4	6	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	4	4'- 0"	4	12"	18'- 5"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 3 3/8"	4'- 2"	6'- 2"	4	12"	7'- 0"	4	12"	7'- 0"			
5	3	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	1	1'- 0"	4	12"	22'- 0"	4	12"	23'- 0"	--	---	----	----	4	12"	2'- 6"	2'- 8"	4'-11"	4	12"	4'- 0"	4	12"	4'- 0"			
5	4	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	2	2'- 0"	4	12"	22'- 0"	4	12"	23'- 0"	--	---	----	----	4	12"	2'- 6"	3'- 2"	5'- 5"	4	12"	5'- 0"	4	12"	5'- 0"			
5	5	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	3	3'- 0"	4	12"	22'- 0"	4	12"	23'- 0"	--	---	----	----	4	12"	2'- 6"	3'- 8"	5'-11"	4	12"	6'- 0"	4	12"	6'- 0"			
5	6	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	4	4'- 0"	4	12"	22'- 0"	4	12"	23'- 0"	--	---	----	----	4	12"	2'- 6"	4'- 2"	6'- 5"	4	12"	7'- 0"	4	12"	7'- 0"			
5	7	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	5	5'- 0"	4	12"	22'- 0"	4	12"	23'- 0"	--	---	----	----	4	12"	2'- 6"	4'- 8"	6'-11"	4	12"	8'- 0"	4	12"	8'- 0"			
6	4	8"	8"	8"	8"	25	25'- 0"	25	25'- 0"	2	2'- 0"	4	12"	25'-11"	4	12"	27'- 0"	4	12"	2'- 8 3/8"	5'- 2"	4	12"	2'- 8 3/8"	3'- 2"	5'- 7"	4	12"	5'- 0"	4	12"	5'- 0"			
6	5	8"	8"	8"	8"	25	25'- 0"	25	25'- 0"	3	3'- 0"	4	12"	25'-11"	4	12"	27'- 0"	4	12"	2'- 8 3/8"	5'- 2"	4	12"	2'- 8 3/8"	3'- 8"	6'- 1"	4	12"	6'- 0"	4	12"	6'- 0"			
6	6	8"	8"	8"	8"	25	25'- 0"	25	25'- 0"	4	4'- 0"	4	12"	25'-11"	4	12"	27'- 0"	4	12"	2'- 8 3/8"	5'- 2"	4	12"	2'- 8 3/8"	4'- 2"	6'- 7"	4	12"	7'- 0"	4	12"	7'- 0"			
6	7	8"	8"	8"	8"	25	25'- 0"	25	25'- 0"	5	5'- 0"	4	12"	25'-11"	4	12"	27'- 0"	4	12"	2'-11"	5'- 8"	4	12"	2'- 8 3/8"	4'- 8"	7'- 1"	4	12"	8'- 0"	4	12"	8'- 0"			
6	8	8"	8"	8"	8"	25	25'- 0"	25	25'- 0"	6	6'- 0"	4	12"	25'-11"	4	12"	27'- 0"	4	12"	3'- 2"	6'- 2"	4	12"	2'- 8 3/8"	5'- 2"	7'- 7"	4	12"	9'- 0"	4	12"	9'- 0"			
7	4	8"	8"	8"	8"	29	29'- 0"	29	29'- 0"	2	2'- 0"	4	12"	29'- 8"	4	12"	31'- 0"	--	---	----	----	5	12"	2'-10 3/4"	3'- 2"	5'- 9"	4	12"	5'- 0"	4	12"	5'- 0"			
7	6	8"	8"	8"	8"	29	29'- 0"	29	29'- 0"	4	4'- 0"	4	12"	29'- 8"	4	12"	31'- 0"	--	---	----	----	5	12"	2'-10 3/4"	4'- 2"	6'- 9"	4	12"	7'- 0"	4	12"	7'- 0"			
7	8	8"	8"	8"	8"	29	29'- 0"	29	29'- 0"	6	6'- 0"	4	12"	29'- 8"	4	12"	31'- 0"	--	---	----	----	5	12"	2'-10 3/4"	5'- 2"	7'- 9"	4	12"	9'- 0"	4	11 1/2"	9'- 0"			
7	10	8"	8"	8"	8"	29	29'- 0"	29	29'- 0"	8	8'- 0"	4	11"	29'- 8"	4	11"	31'- 0"	--	---	----	----	5	11"	2'-10 3/4"	6'- 2"	8'- 9"	5	10"	11'- 0"	4	12"	11'- 0"			
8	4	8 1/4"	8 1/4"	8"	8"	33	33'- 0"	33	33'- 0"	2	2'- 0"	4	11"	33'- 8"	4	11"	35'- 0"	3	11"	3'- 1 1/4"	6'- 0"	5	11"	3'- 1 1/4"	3'- 2 1/4"	6'- 0"	4	9"	5'- 0"	4	12"	5'- 0"			
8	6	8 1/2"	8 1/2"	8"	8"	33	33'- 0"	33	33'- 0"	4	4'- 0"	4	11"	33'- 8"	4	11"	35'- 0"	--	---	----	----	5	11"	3'- 1 1/4"	4'- 2 1/2"	7'- 0"	4	12"	7'- 1"	4	12"	7'- 1"			
8	8	8 1/2"	8 1/2"	8"	8"	33	33'- 0"	33	33'- 0"	6	6'- 0"	4	10"	33'- 8"	4	10"	35'- 0"	--	---	----	----	5	10"	3'- 1 1/4"	5'- 2 1/2"	8'- 0"	4	12"	9'- 1"	4	12"	9'- 1"			
8	10	8 3/4"	8 3/4"	8"	8"	33	33'- 0"	33	33'- 0"	8	8'- 0"	4	9"	33'- 8"	4	9"	35'- 0"	--	---	----	----	5	9"	3'- 1 1/4"	6'- 2 3/4"	9'- 0"	5	11"	11'- 2"	4	12"	11'- 2"			
9	4	9"	9"	8"	8"	37	37'- 0"	37	37'- 0"	2	2'- 0"	5	9"	37'-11"	4	9"	39'- 0"	3	9"	3'- 3 5/8"	6'- 5"	5	9"	3'- 3 5/8"	3'- 3"	6'- 3"	4	8"	5'- 2"	4	12"	5'- 2"			
9	6	9 1/4"	9 1/4"	8"	8"	37	37'- 0"	37	37'- 0"	4	4'- 0"	5	9"	37'-11"	4	9"	39'- 0"	--	---	----	----	5	9"	3'- 3 5/8"	4'- 3 1/4"	7'- 3"	4	12"	7'- 2"	4	12"	7'- 2"			
9	8	9 1/2"	9 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	6	6'- 0"	5	9"	37'-11"	4	9"	39'- 0"	4	9"	3'- 3 5/8"	6'- 4"	4	9"	3'- 3 5/8"	5'- 3 1/2"	8'- 4"	4	12"	9'- 3"	4	12"	9'- 3"			
9	10	9 1/2"	9 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	8	8'- 0"	5	9"	37'-11"	5	9"	39'- 0"	--	---	----	----	5	9"	3'- 3 5/8"	6'- 3 1/2"	9'- 3"	5	12"	11'- 3"	4	12"	11'- 3"			
9	12	9 3/4"	9 3/4"	8"	8"	37	37'- 0"	37	37'- 0"	10	10'- 0"	4	8"	37'-11"	4	8"	39'- 0"	4	8"	4'- 1"	7'-11"	5	8"	3'- 3 5/8"	7'- 3 3/4"	10'- 3"	5	6"	13'- 3"	4	12"	13'- 3"			
10	4	9 3/4"	9 3/4"	8"	8"	41	41'- 0"	41	41'- 0"	2	2'- 0"	5	8"	41'-11"	4	8"	43'- 0"	--	---	----	----	5	8"	3'- 6"	3'- 3 3/4"	6'- 6"	4	7"	5'- 3"	4	12"	5'- 3"			
10	6	10"	10"	8"	8"	41	41'- 0"	41	41'- 0"	4	4'- 0"	5	8"	41'-11"	4	8"	43'- 0"	--	---	----	----	5	8"	3'- 6"	4'- 4"	7'- 6"	4	11 1/2"	7'- 4"	4	12"	7'- 4"			
10	8	10 1/4"	10 1/4"	8"	8"	41	41'- 0"	41	41'- 0"	6	6'- 0"	5	8"	41'-11"	4	8"	43'- 0"	4	8"	3'- 6"	6'- 9"	4	8"	3'- 6"	5'- 4 1/4"	8'- 7"	4	12"	9'- 5"	4	12"	9'- 5"			
10	10	10 1/2"	10 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	8	8'- 0"	5	8"	41'-11"	5	8"	43'- 0"	--	---	----	----	5	8"	3'- 6"	6'- 4 1/4"	9'- 6"	5	12"	11'- 5"	4	12"	11'- 5"			
10	12	10 1/2"	10 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	10	10'- 0"	5	10"	41'-11"	5	10"	43'- 0"	3	10"	4'- 1"	7'-11"	6	10"	4'- 0"	7'- 8"	11'- 4"	5	7"	13'- 5"	4	12"	13'- 5"			
12	6	11 3/4"	11 3/4"	8"	8"	49	49'- 0"	49	49'- 0"	4	4'- 0"	6	12"	49'- 8"	6	12"	51'- 0"	3	12"	3'-10 3/4"	7'- 7"	6	12"	4'- 5"	4'- 9"	8'-10"	4	10"	7'- 8"	4	10"	7'- 8"			
12	8	11 3/4"	11 3/4"	8"	8"	49	49'- 0"	49	49'- 0"	6	6'- 0"	6	11"	49'- 8"	6	11"	51'- 0"	--	---	----	----	6	11"	4'- 5"	5'- 9"	9'-10"	4	12"	9'- 8"	4	12"	9'- 8"			
12	10	12"	12"	8"	8"	49	49'- 0"	49	49'- 0"	8	8'- 0"	6	9"	49'- 8"	5	9"	51'- 0"	3	9"	3'-10 3/4"	7'- 7"	5	9"	3'-10 3/4"	6'- 6"	10'- 1"	5	12"	11'- 8"	4	12"	11'- 8"			
12	12	12 1/4"	12 1/4"	8"	8"	49	49'- 0"	49	49'- 0"	10	10'- 0"	6	9"	49'- 8"	5	9"	51'- 0"	--	---	----	----	6	9"	4'- 5"	7'-10"	11'-10"	6	10 1/2"	13'- 9"	4	12"	13'- 9"			

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2 REVISION DATE
1005.09 07/11

QUADRUPLE BOX CULVERTS
5 TO 10 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

BCQ-10

SPAN		HGHT		REINFORCING STEEL											QUAN./LF		HEADWALLS							WINGWALL	
				BT I													G			HW I					
(FT.)	(FT.)	SIZE	SPACING C-C	a	b	c	d	e	f	g	LENGTH	NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS/LONG. JT)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS/LF)	HEADWALL LENGTH	SIZE	LENGTH	NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. #4 (CY)	INLET REINFORCING STEEL (LBS)		OUTLET CONCRETE CL. #4 (CY)
3	3	4	12"	2'- 8 1/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 7/8"	15'- 9"	60	20	57.160	1.284	141.899	16'- 10"	6	16'- 6"	3	12	2.222	137.876	2.191	99.132
3	4	4	12"	2'- 8 1/8"	0'- 4 1/2"	1'- 6 5/8"	0'- 5 7/8"	0'- 3 3/4"	14'- 11 7/8"	1'- 5 7/8"	15'- 9"	60	30	60.690	1.406	152.339	16'- 10"	6	16'- 6"	3	15	2.333	148.230	2.284	99.132
4	3	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	20	70.520	1.479	168.508	20'- 10"	6	20'- 6"	3	12	2.626	161.908	2.609	123.164
4	4	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	30	74.050	1.602	178.948	20'- 10"	6	20'- 6"	3	15	2.738	172.262	2.702	123.164
4	5	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	40	77.580	1.724	189.388	20'- 10"	6	20'- 6"	3	18	2.849	182.616	2.794	123.164
4	6	4	12"	3'- 6 1/2"	0'- 4 1/2"	1'- 11 1/2"	0'- 5 7/8"	0'- 3 3/4"	19'- 0"	2'- 1"	19'- 9"	76	50	81.110	1.847	199.828	20'- 10"	6	20'- 6"	3	21	2.960	192.970	2.887	123.164
5	3	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	20	83.880	1.675	195.339	24'- 10"	6	24'- 6"	3	12	3.031	185.940	3.027	147.196
5	4	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	30	87.410	1.797	205.779	24'- 10"	6	24'- 6"	3	15	3.142	196.294	3.120	147.196
5	5	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	40	90.940	1.920	216.219	24'- 10"	6	24'- 6"	3	18	3.254	206.648	3.212	147.196
5	6	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	50	94.470	2.043	226.659	24'- 10"	6	24'- 6"	3	21	3.365	217.002	3.305	147.196
5	7	4	12"	4'- 4 1/8"	0'- 4 1/2"	2'- 4 1/4"	0'- 5 7/8"	0'- 3 3/4"	23'- 0"	2'- 8 1/4"	23'- 9"	92	60	98.000	2.165	237.099	24'- 10"	6	24'- 6"	3	24	3.476	227.356	3.398	147.196
6	4	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	30	100.770	1.991	253.889	28'- 10"	6	28'- 6"	3	15	3.547	220.326	3.537	171.228
6	5	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	40	104.300	2.114	264.643	28'- 10"	6	28'- 6"	3	18	3.658	230.680	3.630	171.228
6	6	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	50	107.830	2.236	275.397	28'- 10"	6	28'- 6"	3	21	3.770	241.034	3.723	171.228
6	7	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	60	111.360	2.359	287.512	28'- 10"	6	28'- 6"	3	24	3.881	251.388	3.816	171.228
6	8	4	12"	5'- 1 3/4"	0'- 4 1/2"	2'- 9"	0'- 5 7/8"	0'- 3 3/4"	27'- 0"	3'- 3 1/2"	27'- 9"	108	70	114.890	2.482	299.627	28'- 10"	6	28'- 6"	3	27	3.992	261.742	3.908	171.228
7	4	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	30	114.130	2.187	276.214	32'- 10"	6	32'- 6"	3	15	3.952	244.358	3.955	195.260
7	6	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	50	121.190	2.432	299.219	32'- 10"	6	32'- 6"	3	21	4.174	265.066	4.141	195.260
7	8	4	12"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	70	128.250	2.677	324.059	32'- 10"	6	32'- 6"	3	27	4.397	285.774	4.326	195.260
7	10	4	11"	5'- 11 3/8"	0'- 4 1/2"	3'- 1 7/8"	0'- 5 7/8"	0'- 3 3/4"	31'- 1/8"	3'- 10 5/8"	31'- 10"	124	90	135.310	2.920	374.109	32'- 10"	6	32'- 6"	3	33	4.620	306.482	4.512	195.260
8	4	4	11"	6'- 8 3/4"	0'- 4 3/4"	3'- 6 3/8"	0'- 6 1/4"	0'- 4"	34'- 11 7/8"	4'- 5 5/8"	35'- 10"	140	30	127.490	2.435	333.672	36'- 10"	6	36'- 6"	3	15	4.334	268.390	4.351	219.292
8	6	4	11"	6'- 8 5/8"	0'- 5"	3'- 6 1/8"	0'- 6 1/2"	0'- 4 1/4"	34'- 11 7/8"	4'- 5 5/8"	35'- 10"	140	50	134.550	2.735	345.357	36'- 10"	6	36'- 6"	3	21	4.534	289.098	4.514	219.292
8	8	4	10"	6'- 8 5/8"	0'- 5"	3'- 6 1/8"	0'- 6 1/2"	0'- 4 1/4"	34'- 11 7/8"	4'- 5 5/8"	35'- 10"	140	70	141.610	2.979	386.268	36'- 10"	6	36'- 6"	3	27	4.757	309.806	4.700	219.292
8	10	4	9"	6'- 8 1/2"	0'- 5 1/4"	3'- 5 7/8"	0'- 6 3/8"	0'- 4 1/2"	34'- 11 7/8"	4'- 5 1/8"	35'- 11"	140	90	148.670	3.276	447.410	36'- 10"	6	36'- 6"	3	33	4.957	330.514	4.863	219.292
9	4	4	9"	7'- 6"	0'- 5 1/2"	3'- 10 1/2"	0'- 7 1/4"	0'- 4 3/4"	39'- 0"	5'- 0"	40'- 0"	156	30	140.850	2.812	451.848	40'- 10"	6	40'- 6"	3	15	4.659	292.422	4.689	243.324
9	6	4	9"	7'- 5 5/8"	0'- 5 3/4"	3'- 10 1/4"	0'- 7 5/8"	0'- 5"	39'- 0"	4'- 11 3/4"	40'- 0"	156	50	147.910	3.119	459.598	40'- 10"	6	40'- 6"	3	21	4.875	313.130	4.868	243.324
9	8	4	9"	7'- 5 3/4"	0'- 6"	3'- 10"	0'- 8"	0'- 5 1/4"	39'- 0"	4'- 11 1/2"	40'- 1"	156	70	154.970	3.424	492.432	40'- 10"	6	40'- 6"	3	27	5.072	333.838	5.028	243.324
9	10	4	9"	7'- 5 3/4"	0'- 6"	3'- 10"	0'- 8"	0'- 5 1/4"	39'- 0"	4'- 11 1/2"	40'- 1"	156	90	162.030	3.666	554.516	40'- 10"	6	40'- 6"	3	33	5.295	354.546	5.213	243.324
9	12	4	8"	7'- 5 5/8"	0'- 6 1/4"	3'- 9 3/4"	0'- 8 3/8"	0'- 5 1/2"	39'- 0"	4'- 11 1/4"	40'- 2"	156	110	169.090	3.970	599.804	40'- 10"	6	40'- 6"	3	39	5.492	375.254	5.373	243.324
10	4	4	8"	8'- 3 1/4"	0'- 6 1/4"	4'- 2 1/2"	0'- 8 3/8"	0'- 5 1/2"	43'- 0"	5'- 6 1/2"	44'- 2"	172	30	154.210	3.229	519.693	44'- 10"	6	44'- 6"	3	15	4.985	316.454	5.028	267.356
10	6	4	8"	8'- 3 1/8"	0'- 6 1/2"	4'- 2 1/4"	0'- 8 5/8"	0'- 5 3/4"	43'- 0"	5'- 6 1/4"	44'- 2"	172	50	161.270	3.541	540.827	44'- 10"	6	44'- 6"	3	21	5.179	337.162	5.185	267.356
10	8	4	8"	8'- 3"	0'- 6 3/4"	4'- 2"	0'- 9"	0'- 6"	43'- 0"	5'- 6"	44'- 3"	172	70	168.330	3.853	574.370	44'- 10"	6	44'- 6"	3	27	5.373	357.870	5.342	267.356
10	10	4	8"	8'- 3"	0'- 6 3/4"	4'- 2"	0'- 9"	0'- 6"	43'- 0"	5'- 6"	44'- 3"	172	90	175.390	4.094	649.612	44'- 10"	6	44'- 6"	3	33	5.595	378.578	5.527	267.356
10	12	5	10"	8'- 2 7/8"	0'- 7 1/8"	4'- 1 3/4"	0'- 9 1/2"	0'- 6 1/4"	43'- 0"	5'- 5 3/4"	44'- 3"	172	110	182.450	4.405	688.264	44'- 10"	6	44'- 6"	3	39	5.790	399.286	5.684	267.356
12	6	6	12"	9'- 9 1/2"	0'- 8 1/2"	4'- 10 1/8"	0'- 11 3/8"	0'- 7 1/2"	51'- 1/8"	6'- 6 7/8"	52'- 6"	204	50	187.990	4.575	735.821	52'- 10"	6	52'- 6"	3	21	5.696	385.226	5.728	315.420
12	8	6	11"	9'- 9 1/2"	0'- 8 1/2"	4'- 10 1/8"	0'- 11 3/8"	0'- 7 1/2"	51'- 1/8"	6'- 6 7/8"	52'- 6"	204	70	195.050	4.818	787.944	52'- 10"	6	52'- 6"	3	27	5.918	405.934	5.914	315.420
12	10	5	9"	9'- 9 3/8"	0'- 8 5/8"	4'- 9 5/8"	0'- 11 5/8"	0'- 7 3/4"	51'- 1/8"	6'- 6 5/8"	52'- 7"	204	90	202.110	5.142	811.072	52'- 10"	6	52'- 6"	3	33	6.106	426.642	6.065	315.420
12	12	5	9"	9'- 9 1/4"	0'- 8 7/8"	4'- 9 5/8"	1'- 0"	0'- 8"	51'- 1/8"	6'- 6 3/8"	52'- 8"	204	110	209.170	5.464	873.156	52'- 10"	6	52'- 6"	3	39	6.294	447.350	6.215	315.420

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SPECIFICATION REFERENCE	QUADRUPLE BOX CULVERTS			
	5 TO 10 FT. FILLS			ROAD AND BRIDGE STANDARDS
	VIRGINIA DEPARTMENT OF TRANSPORTATION			REVISION DATE 07/11

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

DIMENSIONS							REINFORCING STEEL																									
SPAN (FT.)	HIGHT (FT.)	T1	T2	T3	T4	A	B	C	D	E	F	BH1			BH2			BH3			BH4			BV1			BV2					
		TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)							SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	1	1'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 4"	2'- 8"	4'- 9"	4	12"	4'- 0"	4	12"	4'- 0"
3	4	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	2	2'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 2"	5'- 3"	4	12"	5'- 0"	4	12"	5'- 0"
4	3	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	1	1'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	2'- 8"	4'- 9"	4	12"	4'- 0"	4	12"	4'- 0"
4	4	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	2	2'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 2"	5'- 3"	4	12"	5'- 0"	4	12"	5'- 0"
4	5	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	3	3'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 8"	5'- 9"	4	12"	6'- 0"	4	12"	6'- 0"
4	6	8"	8"	8"	8"	17	17'- 0"	17	17'- 0"	4	4'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	4'- 2"	6'- 3"	4	12"	7'- 0"	4	12"	7'- 0"
5	3	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	1	1'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	4	12"	2'- 6"	4'- 9"	4	12"	2'- 4"	2'- 8"	4'- 9"	4	12"	4'- 0"	4	12"	4'- 0"
5	4	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	2	2'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	4	12"	2'- 6"	4'- 9"	4	12"	2'- 4"	3'- 2"	5'- 3"	4	12"	5'- 0"	4	12"	5'- 0"
5	5	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	3	3'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	3	12"	2'- 6"	4'- 10"	4	12"	2'- 4"	3'- 8"	5'- 9"	4	12"	6'- 0"	4	12"	6'- 0"
5	6	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	4	4'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	3	12"	2'- 9"	5'- 3"	4	12"	2'- 4"	4'- 2"	6'- 3"	4	12"	7'- 0"	4	12"	7'- 0"
5	7	8"	8"	8"	8"	21	21'- 0"	21	21'- 0"	5	5'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	4	12"	2'- 11"	5'- 7"	4	12"	2'- 4"	4'- 8"	6'- 9"	5	12"	8'- 0"	4	12"	8'- 0"
6	4	9/4"	9/4"	8"	8"	25	25'- 0"	25	25'- 0"	2	2'- 0"	4	12"	25'- 11"	4	12"	27'- 0"	4	12"	2'- 9"	5'- 2"	4	12"	2'- 4"	3'- 4"	5'- 4"	4	12"	5'- 2"	4	12"	5'- 2"
6	5	9/4"	9/4"	8"	8"	25	25'- 0"	25	25'- 0"	3	3'- 0"	4	11"	25'- 11"	4	11"	27'- 0"	4	11"	2'- 9"	5'- 2"	4	11"	2'- 4"	3'- 10"	5'- 10"	4	12"	6'- 2"	4	12"	6'- 2"
6	6	9/2"	9/2"	8"	8"	25	25'- 0"	25	25'- 0"	4	4'- 0"	4	12"	25'- 11"	4	12"	27'- 0"	4	12"	2'- 10"	5'- 5"	4	12"	2'- 4"	4'- 4"	6'- 4"	4	12"	7'- 3"	4	12"	7'- 3"
6	7	9/2"	9/2"	8"	8"	25	25'- 0"	25	25'- 0"	5	5'- 0"	4	11"	25'- 11"	4	11"	27'- 0"	4	11"	3'- 1"	5'- 10"	4	11"	2'- 4"	4'- 10"	6'- 10"	4	12"	8'- 3"	4	12"	8'- 3"
6	8	9/2"	9/2"	8"	8"	25	25'- 0"	25	25'- 0"	6	6'- 0"	4	11"	25'- 8"	4	11"	27'- 0"	--	---	----	----	5	11"	2'- 6"	5'- 6"	7'- 7"	5	12"	9'- 3"	4	12"	9'- 3"
7	4	10/2"	10/2"	8"	8"	29	29'- 0"	29	29'- 0"	2	2'- 0"	4	10"	29'- 11"	4	10"	31'- 0"	3	10"	2'- 11"	5'- 8"	4	10"	2'- 4"	3'- 5"	5'- 5"	4	12"	5'- 5"	4	12"	5'- 5"
7	6	10/4"	10/4"	8"	8"	29	29'- 0"	29	29'- 0"	4	4'- 0"	4	10"	29'- 11"	4	10"	31'- 0"	3	10"	3'- 0"	5'- 8"	4	10"	2'- 4"	4'- 5"	6'- 6"	4	12"	7'- 5"	4	12"	7'- 5"
7	8	11"	11"	8"	8"	29	29'- 0"	29	29'- 0"	6	6'- 0"	4	10"	29'- 11"	4	10"	31'- 0"	3	10"	3'- 5"	6'- 7"	4	10"	2'- 4"	5'- 5"	7'- 6"	5	12"	9'- 6"	4	12"	9'- 6"
7	10	11/4"	11/4"	8"	8"	29	29'- 0"	29	29'- 0"	8	8'- 0"	4	10"	29'- 8"	4	10"	31'- 0"	3	10"	3'- 10"	7'- 5"	5	10"	2'- 6"	6'- 8"	8'- 9"	6	10/2"	11'- 6"	4	12"	11'- 6"
8	4	12"	12"	8"	8"	33	33'- 0"	33	33'- 0"	2	2'- 0"	4	9"	33'- 11"	4	9"	35'- 0"	3	9"	3'- 2"	6'- 1"	4	9"	2'- 4"	3'- 6"	5'- 7"	4	12"	5'- 8"	4	12"	5'- 8"
8	6	12/4"	12/4"	8"	8"	33	33'- 0"	33	33'- 0"	4	4'- 0"	4	9"	33'- 11"	4	9"	35'- 0"	--	---	----	----	4	9"	2'- 4"	4'- 7"	6'- 7"	4	12"	7'- 8"	4	12"	7'- 8"
8	8	12/4"	12/4"	8"	8"	33	33'- 0"	33	33'- 0"	6	6'- 0"	5	9"	33'- 11"	5	9"	35'- 0"	3	9"	3'- 6"	6'- 9"	4	9"	2'- 9"	5'- 7"	8'- 0"	5	12"	9'- 8"	4	12"	9'- 8"
8	10	12/2"	12/2"	8"	8"	33	33'- 0"	33	33'- 0"	8	8'- 0"	5	9"	33'- 8"	5	9"	35'- 0"	3	9"	3'- 11"	7'- 7"	5	9"	2'- 11"	6'- 9"	9'- 3"	5	7"	11'- 9"	4	12"	11'- 9"
9	4	13"	13"	8"	8"	37	37'- 0"	37	37'- 0"	2	2'- 0"	5	8"	37'- 11"	5	8"	39'- 0"	3	8"	3'- 4"	6'- 5"	4	8"	2'- 9"	3'- 7"	6'- 1"	4	10/2"	5'- 10"	4	12"	5'- 10"
9	6	13/4"	13/4"	8"	8"	37	37'- 0"	37	37'- 0"	4	4'- 0"	5	8"	37'- 11"	5	8"	39'- 0"	--	---	----	----	4	8"	2'- 9"	4'- 8"	7'- 1"	4	12"	7'- 10"	4	12"	7'- 10"
9	8	13/4"	13/4"	8"	8"	37	37'- 0"	37	37'- 0"	6	6'- 0"	5	8"	37'- 11"	5	8"	39'- 0"	3	8"	3'- 7"	6'- 11"	4	8"	2'- 9"	5'- 8"	8'- 1"	5	12"	9'- 10"	4	12"	9'- 10"
9	10	13/2"	13/2"	8"	8"	37	37'- 0"	37	37'- 0"	8	8'- 0"	5	8"	37'- 11"	5	8"	39'- 0"	4	8"	4'- 0"	7'- 8"	4	8"	2'- 9"	6'- 8"	9'- 1"	5	8"	11'- 11"	4	12"	11'- 11"
9	12	13/2"	13/2"	9.5"	8"	37	37'- 0"	37	37'- 0"	10	10'- 0"	5	9"	37'- 5"	5	9"	39'- 3"	--	---	----	----	7	9"	3'- 2"	8'- 3"	10'- 11"	6	7/2"	13'- 11"	4	12"	13'- 11"
10	4	14/4"	14/4"	8"	8"	41	41'- 0"	41	41'- 0"	2	2'- 0"	5	9"	41'- 8"	5	9"	43'- 0"	--	---	----	----	5	9"	2'- 11"	3'- 11"	6'- 5"	4	10"	6'- 0"	4	12"	6'- 0"
10	6	14/2"	14/2"	8"	8"	41	41'- 0"	41	41'- 0"	4	4'- 0"	5	9"	41'- 8"	5	9"	43'- 0"	--	---	----	----	5	9"	2'- 11"	4'- 11"	7'- 5"	4	12"	8'- 0"	4	12"	8'- 0"
10	8	14/2"	14/2"	8"	8"	41	41'- 0"	41	41'- 0"	6	6'- 0"	5	9"	41'- 8"	5	9"	43'- 0"	--	---	----	----	5	9"	2'- 11"	5'- 11"	8'- 5"	5	12"	10'- 0"	4	12"	10'- 0"
10	10	14/4"	14/4"	8"	8"	41	41'- 0"	41	41'- 0"	8	8'- 0"	5	9"	41'- 8"	5	9"	43'- 0"	3	9"	4'- 1"	8'- 0"	5	9"	2'- 11"	6'- 11"	9'- 5"	5	8"	12'- 1"	4	12"	12'- 1"
10	12	14/4"	14/4"	9.5"	8"	41	41'- 0"	41	41'- 0"	10	10'- 0"	6	9"	41'- 8"	5	9"	43'- 3"	3	9"	4'- 6"	8'- 9"	6	9"	3'- 5"	8'- 1"	11'- 1"	6	7/2"	14'- 1"	4	12"	14'- 1"
12	6	17"	17"	8"	8"	49	49'- 0"	49	49'- 0"	4	4'- 0"	6	8"	49'- 11"	5	8"	51'- 0"	--	---	----	----	4	8"	3'- 2"	4'- 11"	7'- 10"	4	12"	8'- 6"	4	12"	8'- 6"
12	8	17/4"	17/4"	8"	8"	49	49'- 0"	49	49'- 0"	6	6'- 0"	6	8"	49'- 11"	5	8"	51'- 0"	3	8"	3'- 11"	7'- 8"	4	8"	3'- 2"	6'- 0"	8'- 10"	5	12"	10'- 6"	4	12"	10'- 6"
12	10	17/2"	17/2"	8"	8"	49	49'- 0"	49	49'- 0"	8	8'- 0"	6	8"	49'- 8"	5	8"	51'- 0"	--	---	----	----	5	8"	3'- 4"	7'- 2"	10'- 1"	5	7/2"	12'- 6"	4	12"	12'- 6"
12	12	17/2"	17/2"	9.5"	8"	49	49'- 0"	49	49'- 0"	10	10'- 0"	6	8"	49'- 11"	5	8"	51'- 3"	4	8"	4'- 9"	9'- 2"	5	8"	3'- 4"	8'- 2"	11'- 1"	6	7/2"	14'- 6"	4	12"	14'- 6"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE



ROAD AND BRIDGE STANDARDS

QUADRUPLE BOX CULVERTS

10 TO 20 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

SHEET 1 OF 2

REVISION DATE

1005.11

07/11

SPAN		HIGHT		REINFORCING STEEL												QUAN./LF		HEADWALLS							WINGWALL				
				BTI												REINFORCING STEEL (LBS./LONG. FT)	CONCRETE CLASS #4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HWI		NO. HW2 BARS	NO. HW3 BARS		INLET CONCRETE CL. #4 (CY)	INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. #4 (CY)	OUTLET REINFORCING STEEL (LBS)
(FT.)	(FT.)	SIZE	SPACING C-C	a	b	c	d	e	f	g	LENGTH	NO. B1 #4 BARS	NO. B2 #3 BARS	HEADWALL LENGTH	SIZE				LENGTH										
3	3	4	12"	2'- 7"	0'- 4"	1'- 10"	0'- 5/8"	0'- 3/4"	15'- 0"	1'- 3"	15'- 7"	60	20	57.160	1.283				141.073	16'- 10"	6	16'- 6"			3				
3	4	4	12"	2'- 7"	0'- 4"	1'- 10"	0'- 5/8"	0'- 3/4"	15'- 0"	1'- 3"	15'- 7"	60	30	60.690	1.406	151.513	16'- 10"	6	16'- 6"	3	15	2.333	148.230	2.284	99.132	C			
4	3	4	12"	3'- 5"	0'- 4"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 10"	19'- 7"	76	20	70.520	1.479	167.793	20'- 10"	6	20'- 6"	3	12	2.626	161.908	2.609	123.164	A			
4	4	4	12"	3'- 5"	0'- 4"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 10"	19'- 7"	76	30	74.050	1.602	178.233	20'- 10"	6	20'- 6"	3	15	2.738	172.262	2.702	123.164	C			
4	5	4	12"	3'- 5"	0'- 4"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 10"	19'- 7"	76	40	77.580	1.724	188.673	20'- 10"	6	20'- 6"	3	18	2.849	182.616	2.794	123.164	E			
4	6	4	12"	3'- 5"	0'- 4"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 10"	19'- 7"	76	50	81.110	1.847	199.113	20'- 10"	6	20'- 6"	3	21	2.960	192.970	2.887	123.164	G			
5	3	4	12"	4'- 2"	0'- 4"	2'- 8"	0'- 5/8"	0'- 3/4"	23'- 0"	2'- 5"	23'- 7"	92	20	83.880	1.673	207.164	24'- 10"	6	24'- 6"	3	12	3.031	185.940	3.027	147.196	A			
5	4	4	12"	4'- 2"	0'- 4"	2'- 8"	0'- 5/8"	0'- 3/4"	23'- 0"	2'- 5"	23'- 7"	92	30	87.410	1.796	217.604	24'- 10"	6	24'- 6"	3	15	3.142	196.294	3.120	147.196	C			
5	5	4	12"	4'- 2"	0'- 4"	2'- 8"	0'- 5/8"	0'- 3/4"	23'- 0"	2'- 5"	23'- 7"	92	40	90.940	1.919	222.614	24'- 10"	6	24'- 6"	3	18	3.254	206.648	3.212	147.196	E			
5	6	4	12"	4'- 2"	0'- 4"	2'- 8"	0'- 5/8"	0'- 3/4"	23'- 0"	2'- 5"	23'- 7"	92	50	94.470	2.042	233.655	24'- 10"	6	24'- 6"	3	21	3.365	217.002	3.305	147.196	G			
5	7	4	12"	4'- 2"	0'- 4"	2'- 8"	0'- 5/8"	0'- 3/4"	23'- 0"	2'- 5"	23'- 7"	92	60	98.000	2.163	257.062	24'- 10"	6	24'- 6"	3	24	3.476	227.356	3.398	147.196	I			
6	4	4	12"	4'- 11"	0'- 5/4"	3'- 0"	0'- 7"	0'- 4/2"	27'- 0"	2'- 10"	27'- 11"	108	30	100.770	2.202	247.126	28'- 10"	6	28'- 6"	3	15	3.485	220.326	3.475	171.228	D			
6	5	4	11"	4'- 11"	0'- 5/4"	3'- 0"	0'- 7"	0'- 4/2"	27'- 0"	2'- 10"	27'- 11"	108	40	104.300	2.324	270.040	28'- 10"	6	28'- 6"	3	18	3.596	230.680	3.568	171.228	F			
6	6	4	12"	4'- 11"	0'- 5/2"	3'- 0"	0'- 7/4"	0'- 4/4"	27'- 0"	2'- 10"	27'- 11"	108	50	107.830	2.490	269.021	28'- 10"	6	28'- 6"	3	21	3.691	241.034	3.644	171.228	H			
6	7	4	11"	4'- 11"	0'- 5/2"	3'- 0"	0'- 7/4"	0'- 4/4"	27'- 0"	2'- 10"	27'- 11"	108	60	111.360	2.611	293.415	28'- 10"	6	28'- 6"	3	24	3.803	251.388	3.737	171.228	J			
6	8	4	11"	4'- 11"	0'- 5/2"	3'- 0"	0'- 7/4"	0'- 4/4"	27'- 0"	2'- 10"	27'- 11"	108	70	114.890	2.734	306.706	28'- 10"	6	28'- 6"	3	27	3.914	261.742	3.830	171.228	L			
7	4	4	10"	5'- 7"	0'- 6/2"	3'- 5"	0'- 8/4"	0'- 5/4"	31'- 0"	3'- 3"	32'- 2"	124	30	114.130	2.668	299.731	32'- 10"	6	32'- 6"	3	15	3.778	244.358	3.781	195.260	D			
7	6	4	10"	5'- 7"	0'- 6/4"	3'- 5"	0'- 9"	0'- 6"	31'- 0"	3'- 2"	32'- 2"	124	50	121.190	2.962	321.622	32'- 10"	6	32'- 6"	3	21	3.981	265.066	3.947	195.260	H			
7	8	4	10"	5'- 7"	0'- 7"	3'- 5"	0'- 9/8"	0'- 6/4"	31'- 0"	3'- 2"	32'- 3"	124	70	128.250	3.255	352.053	32'- 10"	6	32'- 6"	3	27	4.184	285.774	4.113	195.260	L			
7	10	4	10"	5'- 6"	0'- 7/4"	3'- 5"	0'- 9/8"	0'- 6/2"	31'- 0"	3'- 1"	32'- 3"	124	90	135.310	3.546	408.419	32'- 10"	6	32'- 6"	3	33	4.388	306.482	4.280	195.260	P			
8	4	4	9"	6'- 3"	0'- 8"	3'- 10"	0'- 10/8"	0'- 7/4"	35'- 0"	3'- 7"	36'- 5"	140	30	127.490	3.251	354.559	36'- 10"	6	36'- 6"	3	15	4.017	268.390	4.034	219.292	D			
8	6	4	9"	6'- 3"	0'- 8/4"	3'- 10"	0'- 11/8"	0'- 7/2"	35'- 0"	3'- 6"	36'- 6"	140	50	134.550	3.551	364.684	36'- 10"	6	36'- 6"	3	21	4.217	289.098	4.197	219.292	H			
8	8	5	9"	6'- 3"	0'- 8/4"	3'- 10"	0'- 11"	0'- 7/8"	35'- 0"	3'- 7"	36'- 5"	140	70	141.610	3.787	514.012	36'- 10"	6	36'- 6"	3	27	4.440	309.806	4.382	219.292	L			
8	10	5	9"	6'- 3"	0'- 8/2"	3'- 10"	0'- 11/8"	0'- 7/8"	35'- 0"	3'- 6"	36'- 6"	140	90	148.670	4.083	575.477	36'- 10"	6	36'- 6"	3	33	4.640	330.514	4.546	219.292	P			
9	4	5	8"	7'- 0"	0'- 9"	4'- 3"	1'- 1/8"	0'- 8/8"	39'- 0"	4'- 0"	40'- 7"	156	30	140.850	3.774	554.231	40'- 10"	6	40'- 6"	3	15	4.270	292.422	4.301	243.324	D			
9	6	5	8"	7'- 0"	0'- 9/4"	4'- 3"	1'- 1/2"	0'- 8/8"	39'- 0"	4'- 0"	40'- 8"	156	50	147.910	4.081	561.360	40'- 10"	6	40'- 6"	3	21	4.468	313.130	4.461	243.324	H			
9	8	5	8"	7'- 0"	0'- 9/4"	4'- 3"	1'- 1/2"	0'- 8/8"	39'- 0"	4'- 0"	40'- 8"	156	70	154.970	4.325	606.495	40'- 10"	6	40'- 6"	3	27	4.690	333.838	4.646	243.324	L			
9	10	5	8"	6'- 11"	0'- 9/2"	4'- 3"	1'- 7/8"	0'- 8/8"	39'- 0"	3'- 11"	40'- 9"	156	90	162.030	4.628	658.293	40'- 10"	6	40'- 6"	3	33	4.888	354.546	4.806	243.324	P			
10	4	5	9"	7'- 8"	0'- 10/4"	4'- 8"	1'- 1/8"	0'- 9/8"	43'- 0"	4'- 5"	44'- 10"	172	30	154.210	4.429	555.819	44'- 10"	6	44'- 6"	3	15	4.471	316.454	4.514	267.356	D			
10	6	5	9"	7'- 8"	0'- 10/2"	4'- 8"	1'- 2/4"	0'- 9/8"	43'- 0"	4'- 4"	44'- 11"	172	50	161.270	4.742	578.457	44'- 10"	6	44'- 6"	3	21	4.665	337.162	4.671	267.356	H			
10	8	5	9"	7'- 8"	0'- 10/2"	4'- 8"	1'- 2/4"	0'- 9/8"	43'- 0"	4'- 4"	44'- 11"	172	70	168.330	4.986	609.791	44'- 10"	6	44'- 6"	3	27	4.887	357.870	4.856	267.356	L			
10	10	5	9"	7'- 8"	0'- 10/4"	4'- 8"	1'- 2/8"	0'- 9/8"	43'- 0"	4'- 4"	45'- 0"	172	90	175.390	5.296	664.116	44'- 10"	6	44'- 6"	3	33	5.082	378.578	5.013	267.356	P			
10	12	6	9"	7'- 9"	0'- 10/4"	4'- 8"	1'- 2/2"	0'- 9/4"	43'- 3"	4'- 4"	45'- 2"	172	110	182.450	5.662	854.988	44'- 10"	6	44'- 6"	3	39	5.304	399.286	5.199	267.356	T			
12	6	6	8"	9'- 1"	1'- 1"	5'- 5"	1'- 5/8"	1'- 0"	51'- 0"	5'- 3"	53'- 5"	204	50	187.990	6.228	856.933	52'- 10"	6	52'- 6"	3	21	4.985	385.226	5.018	315.420	I			
12	8	6	8"	9'- 1"	1'- 1/4"	5'- 5"	1'- 6"	1'- 1/4"	51'- 0"	5'- 2"	53'- 5"	204	70	195.050	6.551	904.742	52'- 10"	6	52'- 6"	3	27	5.173	405.934	5.169	315.420	M			
12	10	6	8"	9'- 1"	1'- 1/2"	5'- 5"	1'- 6/8"	1'- 1/2"	51'- 0"	5'- 2"	53'- 6"	204	90	202.110	6.873	949.975	52'- 10"	6	52'- 6"	3	33	5.361	426.642	5.319	315.420	Q			
12	12	6	8"	9'- 2"	1'- 1/2"	5'- 5"	1'- 6/8"	1'- 1/2"	51'- 3"	5'- 2"	53'- 9"	204	110	209.170	7.252	1039.445	52'- 10"	6	52'- 6"	3	39	5.584	447.350	5.505	315.420	U			

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SPECIFICATION REFERENCE	<h2 style="text-align: center;">QUADRUPLE BOX CULVERTS</h2> <h3 style="text-align: center;">10 TO 20 FT. FILLS</h3> <p style="text-align: center;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>		 ROAD AND BRIDGE STANDARDS	
			REVISION DATE	SHEET 2 OF 2
			07/11	1005.12

DIMENSIONS								REINFORCING STEEL																								
SPAN	HGHT	T1	T2	T3	T4			BH1			BH2			BH3			BH4			BV1			BV2									
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	a	LENGTH	SIZE	SPACING c-c	a	b	LENGTH	SIZE	SPACING c-c	LENGTH	SIZE	SPACING c-c	LENGTH
3	3	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	1	1'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	--	----	----	4	12"	2'- 4"	2'- 8"	4'- 9"	4	12"	4'- 0"	4	12"	4'- 0"
3	4	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	2	2'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	--	----	----	4	12"	2'- 4"	3'- 2"	5'- 3"	4	12"	5'- 0"	4	12"	5'- 0"
4	3	8 1/2"	8 1/2"	8"	8"	17	17'- 0"	17	17'- 0"	1	1'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	--	----	----	4	12"	2'- 4"	2'- 9"	4'- 9"	4	12"	4'- 1"	4	12"	4'- 1"
4	4	8 1/2"	8 1/2"	8"	8"	17	17'- 0"	17	17'- 0"	2	2'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	--	----	----	4	12"	2'- 4"	3'- 3"	5'- 3"	4	12"	5'- 1"	4	12"	5'- 1"
4	5	8 1/2"	8 1/2"	8"	8"	17	17'- 0"	17	17'- 0"	3	3'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	--	----	----	4	12"	2'- 4"	3'- 9"	5'- 9"	4	12"	6'- 1"	4	12"	6'- 1"
4	6	8 1/2"	8 1/2"	8"	8"	17	17'- 0"	17	17'- 0"	4	4'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	--	----	----	4	12"	2'- 4"	4'- 3"	6'- 3"	5	12"	7'- 1"	4	12"	7'- 1"
5	3	10 1/4"	10 1/4"	8"	8"	21	21'- 0"	21	21'- 0"	1	1'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	3	12"	2'- 6"	4'- 10"	4	12"	2'- 4"	2'- 11"	4'- 11"	4	12"	4'- 4"	4	12"	4'- 4"
5	4	10"	10"	8"	8"	21	21'- 0"	21	21'- 0"	2	2'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	3	12"	2'- 6"	4'- 10"	4	12"	2'- 4"	3'- 4"	5'- 5"	4	12"	5'- 4"	4	12"	5'- 4"
5	5	10 1/4"	10 1/4"	8"	8"	21	21'- 0"	21	21'- 0"	3	3'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	3	12"	2'- 9"	5'- 3"	4	12"	2'- 4"	3'- 11"	5'- 11"	4	12"	6'- 4"	4	12"	6'- 4"
5	6	10"	10"	8"	8"	21	21'- 0"	21	21'- 0"	4	4'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	4	12"	2'- 11"	5'- 6"	4	12"	2'- 4"	4'- 4"	6'- 5"	5	12"	7'- 4"	4	12"	7'- 4"
5	7	10"	10"	8"	8"	21	21'- 0"	21	21'- 0"	5	5'- 0"	4	12"	21'- 11"	4	12"	23'- 0"	4	12"	3'- 1"	5'- 11"	4	12"	2'- 4"	4'- 10"	6'- 11"	5	12"	8'- 3"	4	12"	8'- 3"
6	4	12"	12"	8"	8"	25	25'- 0"	25	25'- 0"	2	2'- 0"	4	10"	25'- 11"	4	10"	27'- 0"	--	--	----	----	4	10"	2'- 4"	3'- 6"	5'- 7"	4	12"	5'- 8"	4	12"	5'- 8"
6	5	12 1/4"	12 1/4"	8"	8"	25	25'- 0"	25	25'- 0"	3	3'- 0"	4	10"	25'- 11"	4	10"	27'- 0"	--	--	----	----	4	10"	2'- 4"	4'- 1"	6'- 1"	4	12"	6'- 8"	4	12"	6'- 8"
6	6	11 1/2"	11 1/2"	8"	8"	25	25'- 0"	25	25'- 0"	4	4'- 0"	4	10"	25'- 11"	4	10"	27'- 0"	--	--	----	----	4	10"	2'- 4"	4'- 6"	6'- 6"	4	12"	7'- 7"	4	12"	7'- 7"
6	7	11 1/2"	11 1/2"	8"	8"	25	25'- 0"	25	25'- 0"	5	5'- 0"	4	10"	25'- 11"	4	10"	27'- 0"	3	10"	3'- 3"	6'- 3"	4	10"	2'- 4"	5'- 0"	7'- 0"	5	12"	8'- 6"	4	12"	8'- 6"
6	8	11 3/4"	11 3/4"	8"	8"	25	25'- 0"	25	25'- 0"	6	6'- 0"	4	10"	25'- 8"	4	10"	27'- 0"	--	--	----	----	5	10"	2'- 6"	5'- 8"	7'- 9"	5	8 1/2"	9'- 7"	4	12"	9'- 7"
7	4	13 1/2"	13 1/2"	8"	8"	29	29'- 0"	29	29'- 0"	2	2'- 0"	4	9"	29'- 11"	4	9"	31'- 0"	--	--	----	----	4	9"	2'- 4"	3'- 8"	5'- 8"	4	12"	5'- 11"	4	12"	5'- 11"
7	6	13 1/2"	13 1/2"	8"	8"	29	29'- 0"	29	29'- 0"	4	4'- 0"	4	9"	29'- 11"	5	9"	31'- 0"	--	--	----	----	4	9"	2'- 4"	4'- 8"	6'- 8"	4	12"	7'- 11"	4	12"	7'- 11"
7	8	13 1/4"	13 1/4"	8"	8"	29	29'- 0"	29	29'- 0"	6	6'- 0"	4	9"	29'- 11"	5	9"	31'- 0"	3	9"	3'- 7"	6'- 11"	4	9"	2'- 4"	5'- 8"	7'- 8"	5	9"	9'- 10"	4	12"	9'- 10"
7	10	13 1/4"	13 1/4"	9 1/2"	8"	29	29'- 0"	29	29'- 0"	8	8'- 0"	4	9"	29'- 11"	5	9"	31'- 3"	3	9"	4'- 0"	7'- 9"	5	9"	2'- 6"	6'- 10"	8'- 11"	6	8"	11'- 10"	4	12"	11'- 10"
8	4	15 1/2"	15 1/2"	8"	8"	33	33'- 0"	33	33'- 0"	2	2'- 0"	5	9"	33'- 11"	5	9"	35'- 0"	--	--	----	----	4	9"	2'- 9"	3'- 10"	6'- 3"	4	12"	6'- 3"	4	12"	6'- 3"
8	6	15 1/2"	15 1/2"	8"	8"	33	33'- 0"	33	33'- 0"	4	4'- 0"	5	9"	33'- 11"	5	9"	35'- 0"	--	--	----	----	4	9"	2'- 9"	4'- 10"	7'- 3"	4	12"	8'- 3"	4	12"	8'- 3"
8	8	15 1/4"	15 1/4"	8"	8"	33	33'- 0"	33	33'- 0"	6	6'- 0"	5	9"	33'- 11"	5	9"	35'- 0"	3	9"	3'- 9"	7'- 3"	4	9"	2'- 9"	5'- 10"	8'- 3"	5	9"	10'- 2"	4	12"	10'- 2"
8	10	15"	15"	9 1/2"	8"	33	33'- 0"	33	33'- 0"	8	8'- 0"	5	9"	33'- 11"	5	9"	35'- 3"	3	9"	4'- 1"	8'- 0"	5	9"	2'- 11"	6'- 11"	9'- 6"	7	11 1/2"	12'- 1"	4	12"	12'- 1"
9	4	17"	17"	8"	8"	37	37'- 0"	37	37'- 0"	2	2'- 0"	6	9"	37'- 11"	5	9"	39'- 0"	--	--	----	----	4	9"	3'- 2"	3'- 11"	6'- 10"	4	12"	6'- 6"	4	12"	6'- 6"
9	6	17"	17"	8"	8"	37	37'- 0"	37	37'- 0"	4	4'- 0"	6	9"	37'- 11"	5	9"	39'- 0"	--	--	----	----	4	9"	3'- 2"	4'- 11"	7'- 10"	4	12"	8'- 6"	4	12"	8'- 6"
9	8	17"	17"	8"	8"	37	37'- 0"	37	37'- 0"	6	6'- 0"	6	9"	37'- 8"	5	9"	39'- 0"	--	--	----	----	5	9"	3'- 4"	6'- 2"	9'- 1"	5	9"	10'- 6"	4	12"	10'- 6"
9	10	17"	17"	9"	8"	37	37'- 0"	37	37'- 0"	8	8'- 0"	5	9"	37'- 7"	5	9"	39'- 1"	--	--	----	----	6	9"	3'- 0"	7'- 3"	9'- 10"	6	8"	12'- 6"	4	12"	12'- 6"
9	12	17"	17"	11"	8"	37	37'- 0"	37	37'- 0"	10	10'- 0"	5	9"	37'- 8"	5	9"	39'- 6"	--	--	----	----	7	9"	3'- 2"	8'- 6"	11'- 2"	5	5 1/2"	14'- 6"	4	12"	14'- 6"
10	4	18 1/2"	18 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	2	2'- 0"	6	9"	41'- 11"	6	9"	43'- 0"	--	--	----	----	4	9"	3'- 2"	4'- 1"	6'- 11"	4	12"	6'- 9"	4	10 1/2"	6'- 9"
10	6	18 1/2"	18 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	4	4'- 0"	6	9"	41'- 11"	6	9"	43'- 0"	--	--	----	----	4	9"	3'- 2"	5'- 1"	7'- 11"	4	12"	8'- 9"	4	10 1/2"	8'- 9"
10	8	18 3/4"	18 3/4"	8"	8"	41	41'- 0"	41	41'- 0"	6	6'- 0"	6	9"	41'- 11"	6	9"	43'- 0"	3	9"	4'- 0"	7'- 10"	4	9"	3'- 2"	6'- 1"	9'- 0"	5	9"	10'- 9"	4	11"	10'- 9"
10	10	18 3/4"	18 3/4"	9"	8"	41	41'- 0"	41	41'- 0"	8	8'- 0"	6	9"	41'- 10"	6	9"	43'- 1"	3	9"	4'- 5"	8'- 8"	5	9"	3'- 4"	7'- 3"	10'- 2"	5	5"	12'- 9"	4	11"	12'- 9"
10	12	18 3/4"	18 3/4"	11"	8"	41	41'- 0"	41	41'- 0"	10	10'- 0"	6	9"	41'- 11"	6	9"	43'- 6"	4	9"	4'- 10"	9'- 4"	6	9"	3'- 5"	8'- 5"	11'- 5"	5	5 1/2"	14'- 9"	4	11"	14'- 9"
12	6	21 3/4"	21 3/4"	8"	8"	49	49'- 0"	49	49'- 0"	4	4'- 0"	6	8"	49'- 11"	6	8"	51'- 0"	--	--	----	----	4	8"	3'- 2"	5'- 4"	8'- 3"	4	12"	9'- 3"	4	10"	9'- 3"
12	8	21 3/4"	21 3/4"	8"	8"	49	49'- 0"	49	49'- 0"	6	6'- 0"	6	8"	49'- 11"	6	8"	51'- 0"	3	8"	4'- 3"	8'- 4"	4	8"	3'- 2"	6'- 4"	9'- 3"	5	8 1/2"	11'- 3"	4	10"	11'- 3"
12	10	21 3/4"	21 3/4"	8 1/2"	8"	49	49'- 0"	49	49'- 0"	8	8'- 0"	6	8"	49'- 9"	6	8"	51'- 0"	3	8"	4'- 8"	9'- 2"	5	8"	3'- 4"	7'- 6"	10'- 5"	5	5"	13'- 3"	4	10"	13'- 3"
12	12	21 3/4"	21 3/4"	11"	8"	49	49'- 0"	49	49'- 0"	10	10'- 0"	6	8"	50'- 2"	6	8"	51'- 6"	4	8"	5'- 1"	9'- 10"	5	8"	3'- 4"	8'- 6"	11'- 5"	5	5 1/2"	15'- 3"	4	10"	15'- 3"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2

REVISION DATE

1005.13

07/11

QUADRUPLE BOX CULVERTS

20 TO 30 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

BCQ-30

SPAN		HGT		REINFORCING STEEL											QUAN./LF			HEADWALLS						WINGWALL			
(FT.)	(FT.)	SIZE	SPACING C-C	BTI								NO. BL1 #4 BARS	NO. BL2 #3 BARS	REINFORCING STEEL (LBS./LONG. JT)	CONCRETE CLASS A4 (CY/LF)	REINFORCING STEEL (LBS./LF)	G		HW1		NO. HW2 BARS	NO. HW3 BARS	INLET CONCRETE CL. A4 (CY)		INLET REINFORCING STEEL (LBS)	OUTLET CONCRETE CL. A4 (CY)	OUTLET REINFORCING STEEL (LBS)
				a	b	c	d	e	f	g	LENGTH						HEADWALL LENGTH	SIZE	LENGTH								
3	3	4	12"	2'- 7"	0'- 4"	1'- 10"	0'- 5/8"	0'- 3/4"	15'- 0"	1'- 3"	15'- 7"	60	20	57.160	1.283	141.073	16'-10"	6	16'- 6"	3	12	2.222	137.876	2.191	99.132	A	
3	4	4	12"	2'- 7"	0'- 4"	1'- 10"	0'- 5/8"	0'- 3/4"	15'- 0"	1'- 3"	15'- 7"	60	30	60.690	1.406	151.513	16'-10"	6	16'- 6"	3	15	2.333	148.230	2.284	99.132	C	
4	3	4	12"	3'- 4"	0'- 4 1/2"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 9"	19'- 9"	76	20	70.520	1.538	168.486	20'-10"	6	20'- 6"	3	12	2.606	161.908	2.589	123.164	A	
4	4	4	12"	3'- 4"	0'- 4 1/2"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 9"	19'- 9"	76	30	74.050	1.661	178.926	20'-10"	6	20'- 6"	3	15	2.718	172.262	2.682	123.164	C	
4	5	4	12"	3'- 4"	0'- 4 1/2"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 9"	19'- 9"	76	40	77.580	1.784	189.366	20'-10"	6	20'- 6"	3	18	2.829	182.616	2.774	123.164	E	
4	6	4	12"	3'- 4"	0'- 4 1/2"	2'- 3"	0'- 5/8"	0'- 3/4"	19'- 0"	1'- 9"	19'- 9"	76	50	81.110	1.906	205.118	20'-10"	6	20'- 6"	3	21	2.940	192.970	2.867	123.164	G	
5	3	4	12"	4'- 0"	0'- 6 1/4"	2'- 8"	0'- 8 3/8"	0'- 5/2"	23'- 0"	2'- 0"	24'- 1"	92	20	83.880	1.998	204.855	24'-10"	6	24'- 6"	3	12	2.932	185.940	2.927	147.196	B	
5	4	4	12"	4'- 0"	0'- 6"	2'- 8"	0'- 8"	0'- 5/4"	23'- 0"	2'- 1"	24'- 0"	92	30	87.410	2.084	214.948	24'-10"	6	24'- 6"	3	15	3.056	196.294	3.033	147.196	D	
5	5	4	12"	4'- 0"	0'- 6 1/4"	2'- 8"	0'- 8 3/8"	0'- 5/2"	23'- 0"	2'- 0"	24'- 1"	92	40	90.940	2.243	226.299	24'-10"	6	24'- 6"	3	18	3.154	206.648	3.113	147.196	F	
5	6	4	12"	4'- 0"	0'- 6"	2'- 8"	0'- 8"	0'- 5/4"	23'- 0"	2'- 1"	24'- 0"	92	50	94.470	2.329	248.718	24'-10"	6	24'- 6"	3	21	3.279	217.002	3.219	147.196	H	
5	7	4	12"	4'- 0"	0'- 6"	2'- 8"	0'- 8"	0'- 5/4"	23'- 0"	2'- 1"	24'- 0"	92	60	98.000	2.451	260.977	24'-10"	6	24'- 6"	3	24	3.399	227.356	3.311	147.196	J	
6	4	4	10"	4'- 8"	0'- 8"	3'- 0"	0'- 10 1/8"	0'- 7 1/4"	27'- 0"	2'- 5"	28'- 5"	108	30	100.770	2.665	261.928	28'-10"	6	28'- 6"	3	15	3.307	220.326	3.297	171.228	D	
6	5	4	10"	4'- 8"	0'- 8 1/4"	3'- 0"	0'- 11 1/8"	0'- 7 1/2"	27'- 0"	2'- 4"	28'- 6"	108	40	104.300	2.830	273.007	28'-10"	6	28'- 6"	3	18	3.402	230.680	3.373	171.228	F	
6	6	4	10"	4'- 9"	0'- 7 1/2"	3'- 0"	0'- 10 3/8"	0'- 6 3/4"	27'- 0"	2'- 6"	28'- 4"	108	50	107.830	2.826	282.598	28'-10"	6	28'- 6"	3	21	3.562	241.034	3.515	171.228	H	
6	7	4	10"	4'- 9"	0'- 7 1/2"	3'- 0"	0'- 10 3/8"	0'- 6 3/4"	27'- 0"	2'- 6"	28'- 4"	108	60	111.360	2.947	310.904	28'-10"	6	28'- 6"	3	24	3.673	251.388	3.607	171.228	J	
6	8	4	10"	4'- 8"	0'- 7 3/4"	3'- 0"	0'- 10 1/2"	0'- 7"	27'- 0"	2'- 5"	28'- 5"	108	70	114.890	3.111	334.127	28'-10"	6	28'- 6"	3	27	3.768	261.742	3.684	171.228	L	
7	4	4	9"	5'- 4"	0'- 9 1/2"	3'- 5"	1'- 1"	0'- 8 3/4"	31'- 0"	2'- 9"	32'- 9"	124	30	114.130	3.248	312.794	32'-10"	6	32'- 6"	3	15	3.565	244.358	3.569	195.260	D	
7	6	4	9"	5'- 4"	0'- 9 1/2"	3'- 5"	1'- 1"	0'- 8 3/4"	31'- 0"	2'- 9"	32'- 9"	124	50	121.190	3.490	365.565	32'-10"	6	32'- 6"	3	21	3.788	265.066	3.754	195.260	H	
7	8	4	9"	5'- 4"	0'- 9 1/4"	3'- 5"	1'- 5/8"	0'- 8 1/2"	31'- 0"	2'- 9"	32'- 8"	124	70	128.250	3.685	415.008	32'-10"	6	32'- 6"	3	27	4.011	285.774	3.940	195.260	L	
7	10	4	9"	5'- 6"	0'- 9 1/4"	3'- 5"	1'- 5/8"	0'- 8 1/2"	31'- 3"	2'- 9"	32'- 11"	124	90	135.310	4.040	481.430	32'-10"	6	32'- 6"	3	33	4.233	306.482	4.125	195.260	P	
8	4	5	9"	6'- 0"	0'- 11 1/2"	3'- 10"	1'- 3 5/8"	0'- 10 5/8"	35'- 0"	3'- 0"	37'- 1"	140	30	127.490	4.006	455.459	36'-10"	6	36'- 6"	3	15	3.749	268.390	3.765	219.292	D	
8	6	5	9"	6'- 0"	0'- 11 1/2"	3'- 10"	1'- 3 5/8"	0'- 10 5/8"	35'- 0"	3'- 0"	37'- 1"	140	50	134.550	4.251	477.230	36'-10"	6	36'- 6"	3	21	3.971	289.098	3.951	219.292	H	
8	8	5	9"	6'- 0"	0'- 11 1/4"	3'- 10"	1'- 3 1/4"	0'- 10 3/8"	35'- 0"	3'- 1"	37'- 1"	140	70	141.610	4.440	527.772	36'-10"	6	36'- 6"	3	27	4.190	309.806	4.133	219.292	M	
8	10	5	9"	6'- 2"	0'- 11"	3'- 10"	1'- 3"	0'- 10 1/8"	35'- 3"	3'- 1"	37'- 3"	140	90	148.670	4.743	592.544	36'-10"	6	36'- 6"	3	33	4.417	330.514	4.322	219.292	P	
9	4	6	9"	6'- 8"	1'- 1"	4'- 3"	1'- 5 5/8"	1'- 0"	39'- 0"	3'- 5"	41'- 5"	156	30	140.850	4.742	600.657	40'-10"	6	40'- 6"	3	15	3.882	292.422	3.912	243.324	E	
9	6	6	9"	6'- 8"	1'- 1"	4'- 3"	1'- 5 5/8"	1'- 0"	39'- 0"	3'- 5"	41'- 5"	156	50	147.910	4.987	622.427	40'-10"	6	40'- 6"	3	21	4.104	313.130	4.097	243.324	I	
9	8	6	9"	6'- 8"	1'- 1"	4'- 3"	1'- 5 5/8"	1'- 0"	39'- 0"	3'- 5"	41'- 5"	156	70	154.970	5.230	677.154	40'-10"	6	40'- 6"	3	27	4.327	333.838	4.283	243.324	M	
9	10	5	9"	6'- 9"	1'- 1"	4'- 3"	1'- 5 3/4"	1'- 1/8"	39'- 1"	3'- 4"	41'- 7"	156	90	162.030	5.558	652.398	40'-10"	6	40'- 6"	3	33	4.550	354.546	4.468	243.324	Q	
9	12	5	9"	6'- 11"	1'- 1"	4'- 3"	1'- 5 3/4"	1'- 1/8"	39'- 6"	3'- 4"	41'- 11"	156	110	169.090	5.995	722.430	40'-10"	6	40'- 6"	3	39	4.727	375.254	4.608	243.324	U	
10	4	6	9"	7'- 4"	1'- 2 1/2"	4'- 8"	1'- 7 3/4"	1'- 1 1/2"	43'- 0"	3'- 9"	45'- 8"	172	30	154.210	5.554	714.032	44'-10"	6	44'- 6"	3	15	4.004	316.454	4.047	267.356	E	
10	6	6	9"	7'- 4"	1'- 2 1/2"	4'- 8"	1'- 7 3/4"	1'- 1 1/2"	43'- 0"	3'- 9"	45'- 8"	172	50	161.270	5.799	736.948	44'-10"	6	44'- 6"	3	21	4.227	337.162	4.233	267.356	I	
10	8	6	9"	7'- 4"	1'- 2 3/4"	4'- 8"	1'- 8 1/8"	1'- 1 3/4"	43'- 0"	3'- 8"	45'- 9"	172	70	168.330	6.109	789.369	44'-10"	6	44'- 6"	3	27	4.421	357.870	4.390	267.356	M	
10	10	6	9"	7'- 5"	1'- 2 3/4"	4'- 8"	1'- 8 1/8"	1'- 1 3/4"	43'- 1"	3'- 8"	45'- 11"	172	90	175.390	6.431	866.899	44'-10"	6	44'- 6"	3	33	4.643	378.578	4.575	267.356	Q	
10	12	6	9"	7'- 7"	1'- 2 3/4"	4'- 8"	1'- 8 1/8"	1'- 1 3/4"	43'- 6"	3'- 8"	46'- 3"	172	110	182.450	6.871	940.128	44'-10"	6	44'- 6"	3	39	4.840	399.286	4.714	267.356	U	
12	6	6	8"	8'- 8"	1'- 5 3/4"	5'- 5"	2'- 3/8"	1'- 4 3/4"	51'- 0"	4'- 5"	54'- 4"	204	50	187.990	7.727	944.848	52'-10"	6	52'- 6"	3	21	4.344	385.226	4.377	315.420	J	
12	8	6	8"	8'- 8"	1'- 5 3/4"	5'- 5"	2'- 3/8"	1'- 4 3/4"	51'- 0"	4'- 5"	54'- 4"	204	70	195.050	7.969	1005.543	52'-10"	6	52'- 6"	3	27	4.567	405.934	4.562	315.420	N	
12	10	6	8"	8'- 9"	1'- 5 3/4"	5'- 5"	2'- 3/8"	1'- 4 3/4"	51'- 0"	4'- 5"	54'- 5"	204	90	202.110	8.252	1086.055	52'-10"	6	52'- 6"	3	33	4.789	426.642	4.748	315.420	R	
12	12	6	8"	8'- 11"	1'- 5 3/4"	5'- 5"	2'- 3/8"	1'- 4 3/4"	51'- 6"	4'- 5"	54'- 10"	204	110	209.170	8.742	1137.009	52'-10"	6	52'- 6"	3	39	4.964	447.350	4.885	315.420	V	

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SPECIFICATION
REFERENCE

QUADRUPLE BOX CULVERTS
20 TO 30 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE

SHEET 2 OF 2

07/11

1005.14

FOR TYPICAL SECTION, NOTES AND OTHER DETAILS, REFER TO STANDARD BCQ-DT.

DIMENSIONS						REINFORCING STEEL																										
SPAN	HGHT	T1	T2	T3	T4	BH1		BH2		BH3		BH4			BV1			BV2														
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	1	1'- 0"	4	12"	13'-11"	4	12"	15'- 0"	4	12"	2'- 2"	4'- 0"	4	12"	2'- 4"	2'- 8"	4'- 9"	4	12"	4'- 0"	4	12"	4'- 0"
3	4	8"	8"	8"	8"	13	13'- 0"	13	13'- 0"	2	2'- 0"	4	12"	13'-11"	4	12"	15'- 0"	3	12"	2'- 4"	4'- 5"	4	12"	2'- 4"	3'- 2"	5'- 3"	4	12"	5'- 0"	4	12"	5'- 0"
4	3	10"	10"	8"	8"	17	17'- 0"	17	17'- 0"	1	1'- 0"	4	12"	17'-11"	4	12"	19'- 0"	--	---	---	---	4	12"	2'- 4"	2'- 10"	4'- 11"	4	12"	4'- 4"	4	12"	4'- 4"
4	4	9 3/4"	9 3/4"	8"	8"	17	17'- 0"	17	17'- 0"	2	2'- 0"	4	12"	17'-11"	4	12"	19'- 0"	--	---	---	---	4	12"	2'- 4"	3'- 4"	5'- 5"	4	12"	5'- 3"	4	12"	5'- 3"
4	5	9 3/4"	9 3/4"	8"	8"	17	17'- 0"	17	17'- 0"	3	3'- 0"	4	12"	17'-11"	4	12"	19'- 0"	--	---	---	---	4	12"	2'- 4"	3'- 10"	5'- 11"	4	12"	6'- 3"	4	12"	6'- 3"
4	6	9 3/4"	9 3/4"	8"	8"	17	17'- 0"	17	17'- 0"	4	4'- 0"	4	12"	17'-11"	4	12"	19'- 0"	4	12"	2'- 11"	5'- 6"	4	12"	2'- 4"	4'- 4"	6'- 5"	5	12"	7'- 3"	4	12"	7'- 3"
5	3	12"	12"	8"	8"	21	21'- 0"	21	21'- 0"	1	1'- 0"	4	11"	21'-11"	4	11"	23'- 0"	--	---	---	---	4	11"	2'- 4"	3'- 0"	5'- 1"	4	12"	4'- 8"	4	12"	4'- 8"
5	4	12"	12"	8"	8"	21	21'- 0"	21	21'- 0"	2	2'- 0"	4	11"	21'-11"	4	11"	23'- 0"	--	---	---	---	4	11"	2'- 4"	3'- 6"	5'- 7"	4	12"	5'- 8"	4	12"	5'- 8"
5	5	11 3/4"	11 3/4"	8"	8"	21	21'- 0"	21	21'- 0"	3	3'- 0"	4	11"	21'-11"	4	11"	23'- 0"	--	---	---	---	4	11"	2'- 4"	4'- 0"	6'- 1"	4	12"	6'- 7"	4	12"	6'- 7"
5	6	11 3/4"	11 3/4"	8"	8"	21	21'- 0"	21	21'- 0"	4	4'- 0"	4	11"	21'-11"	4	11"	23'- 0"	3	11"	3'- 1"	5'- 10"	4	11"	2'- 4"	4'- 6"	6'- 7"	5	12"	7'- 7"	4	12"	7'- 7"
5	7	11 3/4"	11 3/4"	8"	8"	21	21'- 0"	21	21'- 0"	5	5'- 0"	4	11"	21'-11"	4	11"	23'- 0"	4	11"	3'- 3"	6'- 2"	4	11"	2'- 4"	5'- 0"	7'- 1"	5	8 1/2"	8'- 7"	4	12"	8'- 7"
6	4	14"	14"	8"	8"	25	25'- 0"	25	25'- 0"	2	2'- 0"	4	9"	25'-11"	4	9"	27'- 0"	--	---	---	---	4	9"	2'- 4"	3'- 8"	5'- 9"	4	12"	6'- 0"	4	12"	6'- 0"
6	5	14"	14"	8"	8"	25	25'- 0"	25	25'- 0"	3	3'- 0"	4	9"	25'-11"	4	9"	27'- 0"	--	---	---	---	4	9"	2'- 4"	4'- 2"	6'- 3"	4	12"	7'- 0"	4	12"	7'- 0"
6	6	14"	14"	8"	8"	25	25'- 0"	25	25'- 0"	4	4'- 0"	4	9"	25'-11"	4	9"	27'- 0"	--	---	---	---	4	9"	2'- 4"	4'- 8"	6'- 9"	5	12"	8'- 0"	4	12"	8'- 0"
6	7	14"	14"	8"	8"	25	25'- 0"	25	25'- 0"	5	5'- 0"	4	9"	25'-11"	4	9"	27'- 0"	3	9"	3'- 5"	6'- 8"	4	9"	2'- 4"	5'- 2"	7'- 3"	5	8 1/2"	9'- 0"	4	12"	9'- 0"
6	8	14"	14"	8 1/2"	8"	25	25'- 0"	25	25'- 0"	6	6'- 0"	4	9"	25'-9"	4	9"	27'- 1"	--	---	---	---	5	9"	2'- 6"	5'- 10"	8'- 0"	5	6"	10'- 0"	4	12"	10'- 0"
7	4	16 1/2"	16 1/2"	8"	8"	29	29'- 0"	29	29'- 0"	2	2'- 0"	5	9"	29'-11"	5	9"	31'- 0"	--	---	---	---	4	9"	2'- 9"	3'- 11"	6'- 4"	4	12"	6'- 5"	4	11 1/2"	6'- 5"
7	6	16"	16"	8"	8"	29	29'- 0"	29	29'- 0"	4	4'- 0"	5	9"	29'-11"	5	9"	31'- 0"	--	---	---	---	4	9"	2'- 9"	4'- 10"	7'- 4"	5	12"	8'- 3"	4	11 1/2"	8'- 3"
7	8	15 3/4"	15 3/4"	8"	8"	29	29'- 0"	29	29'- 0"	6	6'- 0"	5	9"	29'-11"	5	9"	31'- 0"	3	9"	3'- 9"	7'- 4"	4	9"	2'- 9"	5'- 10"	8'- 4"	5	6"	10'- 3"	4	11 1/2"	10'- 3"
7	10	15 3/4"	15 3/4"	10 1/2"	8"	29	29'- 0"	29	29'- 0"	8	8'- 0"	5	9"	30'-1"	5	9"	31'- 5"	3	9"	4'- 2"	8'- 2"	5	9"	2'- 11"	7'- 0"	9'- 6"	6	6 1/2"	12'- 3"	4	12"	12'- 3"
8	4	18 1/2"	18 1/2"	8"	8"	33	33'- 0"	33	33'- 0"	2	2'- 0"	5	9"	33'-11"	5	9"	35'- 0"	--	---	---	---	4	9"	2'- 9"	4'- 1"	6'- 6"	4	12"	6'- 9"	4	10 1/2"	6'- 9"
8	6	18"	18"	8"	8"	33	33'- 0"	33	33'- 0"	4	4'- 0"	5	8"	33'-11"	5	8"	35'- 0"	--	---	---	---	4	8"	2'- 9"	5'- 0"	7'- 6"	5	12"	8'- 7"	4	10 1/2"	8'- 7"
8	8	17 3/4"	17 3/4"	8"	8"	33	33'- 0"	33	33'- 0"	6	6'- 0"	5	8"	33'-11"	5	8"	35'- 0"	3	8"	3'- 11"	7'- 8"	4	8"	2'- 9"	6'- 0"	8'- 6"	5	6"	10'- 7"	4	10 1/2"	10'- 7"
8	10	18"	18"	10 1/2"	8"	33	33'- 0"	33	33'- 0"	8	8'- 0"	5	8"	34'-1"	5	8"	35'- 4"	3	8"	4'- 4"	8'- 6"	5	8"	2'- 11"	7'- 2"	9'- 9"	6	8	12'- 7"	4	10 1/2"	12'- 7"
9	4	20 1/2"	20 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	2	2'- 0"	6	9"	37'-11"	6	9"	39'- 0"	--	---	---	---	4	9"	3'- 2"	4'- 3"	7'- 1"	4	12"	7'- 0"	4	10"	7'- 0"
9	6	20 1/2"	20 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	4	4'- 0"	6	9"	37'-11"	6	9"	39'- 0"	--	---	---	---	4	9"	3'- 2"	5'- 3"	8'- 1"	5	12"	9'- 0"	4	10"	9'- 0"
9	8	20"	20"	8"	8"	37	37'- 0"	37	37'- 0"	6	6'- 0"	6	9"	37'-8"	6	9"	39'- 0"	--	---	---	---	5	9"	3'- 4"	6'- 5"	9'- 4"	5	6"	11'- 0"	4	10"	11'- 0"
9	10	20"	20"	10 1/2"	8"	37	37'- 0"	37	37'- 0"	8	8'- 0"	6	9"	37'-10"	6	9"	39'- 4"	--	---	---	---	6	9"	3'- 5"	7'- 6"	10'- 6"	6	9"	13'- 0"	4	10"	13'- 0"
9	12	20"	20"	13"	8"	37	37'- 0"	37	37'- 0"	10	10'- 0"	6	9"	38'-0"	6	9"	39'- 9"	3	9"	4'- 11"	9'- 8"	7	9"	3'- 7"	8'- 9"	11'- 10"	7	10 1/2"	15'- 0"	4	10"	15'- 0"
10	4	22 1/2"	22 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	2	2'- 0"	6	9"	41'-11"	6	9"	43'- 0"	--	---	---	---	4	9"	3'- 2"	4'- 5"	7'- 3"	4	12"	7'- 5"	4	10"	7'- 5"
10	6	22 1/2"	22 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	4	4'- 0"	6	9"	41'-11"	6	9"	43'- 0"	--	---	---	---	4	9"	3'- 2"	5'- 5"	8'- 3"	5	12"	9'- 4"	4	10"	9'- 4"
10	8	22 1/2"	22 1/2"	8"	8"	41	41'- 0"	41	41'- 0"	6	6'- 0"	6	9"	41'-11"	6	9"	43'- 0"	3	9"	4'- 4"	8'- 6"	4	9"	3'- 2"	6'- 5"	9'- 3"	6	9"	11'- 4"	4	10"	11'- 4"
10	10	22 1/2"	22 1/2"	10"	8"	41	41'- 0"	41	41'- 0"	8	8'- 0"	7	9"	41'-9"	6	9"	43'- 3"	--	---	---	---	6	9"	4'- 1"	7'- 9"	11'- 5"	6	6"	13'- 4"	4	10"	13'- 4"
10	12	22 1/2"	22 1/2"	12 1/2"	8"	41	41'- 0"	41	41'- 0"	10	10'- 0"	6	9"	42'-2"	6	9"	43'- 9"	3	9"	5'- 2"	10'- 1"	6	9"	3'- 5"	8'- 9"	11'- 9"	6	7 1/2"	15'- 4"	4	9"	15'- 4"
12	6	27"	27"	8"	8"	49	49'- 0"	49	49'- 0"	4	4'- 0"	6	8"	49'-11"	6	8"	51'- 0"	--	---	---	---	4	8"	3'- 2"	5'- 9"	8'- 8"	5	11"	10'- 1"	4	9"	10'- 1"
12	8	27"	27"	8"	8"	49	49'- 0"	49	49'- 0"	6	6'- 0"	6	8"	49'-11"	6	8"	51'- 0"	--	---	---	---	4	8"	3'- 2"	6'- 9"	9'- 8"	5	5 1/2"	12'- 1"	4	9"	12'- 1"
12	10	27"	27"	9"	8"	49	49'- 0"	49	49'- 0"	8	8'- 0"	6	8"	49'-10"	6	8"	51'- 1"	3	8"	5'- 2"	10'- 0"	5	8"	3'- 4"	7'- 11"	10'- 11"	7	8"	14'- 1"	4	9"	14'- 1"
12	12	27"	27"	12"	8"	49	49'- 0"	49	49'- 0"	10	10'- 0"	6	8"	50'-4"	6	8"	51'- 7"	4	8"	5'- 6"	10'- 9"	5	8"	3'- 4"	8'- 11"	11'- 11"	5	5"	16'- 2"	4	9"	16'- 2"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

VDOT ROAD AND BRIDGE STANDARDS	
SHEET 1 OF 2	REVISION DATE
1005.15	07/11

QUADRUPLE BOX CULVERTS
30 TO 40 FT. FILLS
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

DIMENSIONS							REINFORCING STEEL																									
SPAN	HGHT	T1	T2	T3	T4		BH1						BH2			BH3			BH4			BV1			BV2							
(FT.)	(FT.)	TOP SLAB	BOTTOM SLAB	EXTERIOR WALL (IN.)	INTERIOR WALL (IN.)	A	B	C	D	E	F	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	a	LENGTH	SIZE	SPACING C-C	a	b	LENGTH	SIZE	SPACING C-C	LENGTH	SIZE	SPACING C-C	LENGTH
3	3	9"	9"	8"	8"	13	13'- 0"	13	13'- 0"	1	1'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 4"	2'- 9"	4'- 10"	4	12"	4'- 2"	4	12"	4'- 2"
3	4	9"	9"	8"	8"	13	13'- 0"	13	13'- 0"	2	2'- 0"	4	12"	13'- 11"	4	12"	15'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 3"	5'- 4"	4	12"	5'- 2"	4	12"	5'- 2"
4	3	11 1/2"	11 1/2"	8"	8"	17	17'- 0"	17	17'- 0"	1	1'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 0"	5'- 0"	4	12"	4'- 7"	4	12"	4'- 7"
4	4	11 1/4"	11 1/4"	8"	8"	17	17'- 0"	17	17'- 0"	2	2'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 6"	5'- 6"	4	12"	5'- 6"	4	12"	5'- 6"
4	5	11"	11"	8"	8"	17	17'- 0"	17	17'- 0"	3	3'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	--	---	----	----	4	12"	2'- 4"	3'- 11"	6'- 0"	5	12"	6'- 6"	4	12"	6'- 6"
4	6	11 1/4"	11 1/4"	8"	8"	17	17'- 0"	17	17'- 0"	4	4'- 0"	4	12"	17'- 11"	4	12"	19'- 0"	4	12"	3'- 0"	5'- 9"	4	12"	2'- 4"	4'- 6"	6'- 6"	5	9"	7'- 6"	4	12"	7'- 6"
5	3	13 3/4"	13 3/4"	8"	8"	21	21'- 0"	21	21'- 0"	1	1'- 0"	4	10"	21'- 11"	4	10"	23'- 0"	--	---	----	----	4	10"	2'- 4"	3'- 2"	5'- 3"	4	12"	4'- 11"	4	12"	4'- 11"
5	4	13 1/2"	13 1/2"	8"	8"	21	21'- 0"	21	21'- 0"	2	2'- 0"	4	9"	21'- 11"	4	9"	23'- 0"	--	---	----	----	4	9"	2'- 4"	3'- 8"	5'- 8"	4	12"	5'- 11"	4	12"	5'- 11"
5	5	13 1/2"	13 1/2"	8"	8"	21	21'- 0"	21	21'- 0"	3	3'- 0"	4	9"	21'- 11"	4	9"	23'- 0"	--	---	----	----	4	9"	2'- 4"	4'- 2"	6'- 2"	5	12"	6'- 11"	4	12"	6'- 11"
5	6	13 1/2"	13 1/2"	8"	8"	21	21'- 0"	21	21'- 0"	4	4'- 0"	4	10"	21'- 11"	4	10"	23'- 0"	3	10"	3'- 2"	6'- 2"	4	10"	2'- 4"	4'- 8"	6'- 8"	5	10"	7'- 11"	4	12"	7'- 11"
5	7	13 1/2"	13 1/2"	8 1/2"	8"	21	21'- 0"	21	21'- 0"	5	5'- 0"	4	10"	21'- 9"	4	10"	23'- 1"	--	---	----	----	5	10"	2'- 6"	5'- 4"	7'- 5"	6	10 1/2"	8'- 11"	4	12"	8'- 11"
6	4	16 1/2"	16 1/2"	8"	8"	25	25'- 0"	25	25'- 0"	2	2'- 0"	4	9"	25'- 11"	5	9"	27'- 0"	--	---	----	----	4	9"	2'- 4"	3'- 11"	5'- 11"	4	12"	6'- 5"	4	11"	6'- 5"
6	5	16 1/2"	16 1/2"	8"	8"	25	25'- 0"	25	25'- 0"	3	3'- 0"	4	9"	25'- 11"	5	9"	27'- 0"	--	---	----	----	4	9"	2'- 4"	4'- 5"	6'- 5"	5	12"	7'- 5"	4	11"	7'- 5"
6	6	16 1/2"	16 1/2"	8"	8"	25	25'- 0"	25	25'- 0"	4	4'- 0"	4	9"	25'- 11"	5	9"	27'- 0"	--	---	----	----	4	9"	2'- 4"	4'- 11"	6'- 11"	5	9 1/2"	8'- 4"	4	11"	8'- 4"
6	7	16"	16"	8"	8"	25	25'- 0"	25	25'- 0"	5	5'- 0"	4	9"	25'- 11"	5	9"	27'- 0"	3	9"	3'- 7"	7'- 0"	4	9"	2'- 4"	5'- 4"	7'- 5"	5	6 1/2"	9'- 3"	4	11"	9'- 3"
6	8	16"	16"	9 1/2"	8"	25	25'- 0"	25	25'- 0"	6	6'- 0"	4	9"	25'- 11"	5	9"	27'- 3"	--	---	----	----	5	9"	2'- 6"	6'- 0"	8'- 2"	5	5"	10'- 3"	4	11"	10'- 3"
7	4	19"	19"	8"	8"	29	29'- 0"	29	29'- 0"	2	2'- 0"	5	8"	29'- 11"	5	8"	31'- 0"	--	---	----	----	4	8"	2'- 9"	4'- 2"	6'- 7"	4	12"	6'- 10"	4	10"	6'- 10"
7	6	18 1/2"	18 1/2"	8"	8"	29	29'- 0"	29	29'- 0"	4	4'- 0"	5	8"	29'- 11"	5	8"	31'- 0"	--	---	----	----	4	8"	2'- 9"	5'- 1"	7'- 6"	5	9 1/2"	8'- 9"	4	10"	8'- 9"
7	8	18 1/2"	18 1/2"	9 1/2"	8"	29	29'- 0"	29	29'- 0"	6	6'- 0"	5	9"	29'- 11"	5	9"	31'- 3"	--	---	----	----	5	9"	2'- 11"	6'- 3"	8'- 9"	6	7 1/2"	10'- 9"	4	10"	10'- 9"
7	10	18"	18"	11 1/2"	8"	29	29'- 0"	29	29'- 0"	8	8'- 0"	5	9"	30'- 3"	5	9"	31'- 7"	4	9"	4'- 4"	8'- 5"	5	9"	2'- 11"	7'- 2"	9'- 9"	7	9"	12'- 7"	4	10"	12'- 7"
8	4	21"	21"	8"	8"	33	33'- 0"	33	33'- 0"	2	2'- 0"	6	9"	33'- 11"	5	9"	35'- 0"	--	---	----	----	4	9"	3'- 2"	4'- 3"	7'- 2"	4	12"	7'- 2"	4	10"	7'- 2"
8	6	21"	21"	8"	8"	33	33'- 0"	33	33'- 0"	4	4'- 0"	6	9"	33'- 11"	5	9"	35'- 0"	--	---	----	----	4	9"	3'- 2"	5'- 3"	8'- 2"	5	9"	9'- 1"	4	10"	9'- 1"
8	8	21"	21"	9"	8"	33	33'- 0"	33	33'- 0"	6	6'- 0"	6	9"	33'- 10"	5	9"	35'- 1"	--	---	----	----	5	9"	3'- 4"	6'- 5"	9'- 5"	5	4 1/2"	11'- 1"	4	10"	11'- 1"
8	10	20 1/2"	20 1/2"	11 1/2"	8"	33	33'- 0"	33	33'- 0"	8	8'- 0"	6	9"	34'- 0"	5	9"	35'- 6"	--	---	----	----	6	9"	3'- 5"	7'- 7"	10'- 7"	7	9"	13'- 0"	4	10"	13'- 0"
9	4	23 1/2"	23 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	2	2'- 0"	6	9"	37'- 11"	6	9"	39'- 0"	--	---	----	----	4	9"	3'- 2"	4'- 6"	7'- 4"	4	12"	7'- 7"	4	10"	7'- 7"
9	6	23 1/2"	23 1/2"	8"	8"	37	37'- 0"	37	37'- 0"	4	4'- 0"	6	9"	37'- 11"	6	9"	39'- 0"	--	---	----	----	4	9"	3'- 2"	5'- 6"	8'- 4"	5	8"	9'- 6"	4	10"	9'- 6"
9	8	23"	23"	8 1/2"	8"	37	37'- 0"	37	37'- 0"	6	6'- 0"	6	9"	37'- 9"	6	9"	39'- 0"	--	---	----	----	5	9"	3'- 4"	6'- 8"	9'- 7"	6	7 1/2"	11'- 6"	4	10"	11'- 6"
9	10	23"	23"	11 1/2"	8"	37	37'- 0"	37	37'- 0"	8	8'- 0"	6	9"	38'- 0"	6	9"	39'- 6"	--	---	----	----	6	9"	3'- 5"	7'- 9"	10'- 9"	6	6"	13'- 6"	4	10"	13'- 6"
9	12	23"	23"	14"	8"	37	37'- 0"	37	37'- 0"	10	10'- 0"	6	9"	38'- 2"	6	9"	40'- 0"	3	9"	5'- 2"	10'- 2"	7	9"	3'- 7"	9'- 0"	12'- 1"	6	7"	15'- 6"	4	10"	15'- 6"
10	4	26"	26"	8"	8"	41	41'- 0"	41	41'- 0"	2	2'- 0"	7	9"	41'- 11"	6	9"	43'- 0"	--	---	----	----	4	9"	3'- 10"	4'- 8"	8'- 3"	4	12"	8'- 0"	4	9"	8'- 0"
10	6	26"	26"	8"	8"	41	41'- 0"	41	41'- 0"	4	4'- 0"	6	9"	41'- 11"	6	9"	43'- 0"	--	---	----	----	4	9"	3'- 2"	5'- 8"	8'- 7"	5	8"	10'- 0"	4	9"	10'- 0"
10	8	26"	26"	8"	8"	41	41'- 0"	41	41'- 0"	6	6'- 0"	6	9"	41'- 11"	6	9"	43'- 0"	3	9"	4'- 8"	9'- 1"	4	9"	3'- 2"	6'- 8"	9'- 7"	5	4 1/2"	12'- 0"	4	9"	12'- 0"
10	10	26"	26"	11"	8"	41	41'- 0"	41	41'- 0"	8	8'- 0"	6	9"	42'- 2"	6	9"	43'- 6"	3	9"	5'- 0"	9'- 10"	5	9"	3'- 4"	7'- 10"	10'- 10"	6	6"	14'- 0"	4	9"	14'- 0"
10	12	26"	26"	14"	8"	41	41'- 0"	41	41'- 0"	10	10'- 0"	6	9"	42'- 5"	6	9"	44'- 0"	3	9"	5'- 5"	10'- 8"	6	9"	3'- 5"	9'- 0"	12'- 0"	7	9 1/2"	16'- 0"	4	9"	16'- 0"
12	6	31"	31"	8"	8"	49	49'- 0"	49	49'- 0"	4	4'- 0"	7	9"	49'- 11"	7	9"	51'- 0"	--	---	----	----	4	9"	3'- 10"	6'- 2"	9'- 8"	5	7"	10'- 10"	4	7 1/2"	10'- 10"
12	8	30 1/2"	30 1/2"	8"	8"	49	49'- 0"	49	49'- 0"	6	6'- 0"	7	9"	49'- 11"	7	9"	51'- 0"	3	9"	5'- 0"	9'- 10"	4	9"	3'- 10"	7'- 1"	10'- 7"	6	6 1/2"	12'- 8"	4	7 1/2"	12'- 8"
12	10	30 1/2"	30 1/2"	9 3/4"	8"	49	49'- 0"	49	49'- 0"	8	8'- 0"	7	9"	49'- 8"	7	9"	51'- 3"	--	---	----	----	6	9"	4'- 1"	8'- 5"	12'- 1"	7	8"	14'- 8"	4	7 1/2"	14'- 8"
12	12	31"	31"	13"	8"	49	49'- 0"	49	49'- 0"	10	10'- 0"	7	8"	50'- 3"	7	8"	51'- 9"	3	8"	5'- 10"	11'- 6"	6	8"	4'- 1"	9'- 5"	13'- 1"	9	12"	16'- 10"	4	7 1/2"	16'- 10"

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VDOT
ROAD AND BRIDGE STANDARDS

SHEET 1 OF 2 REVISION DATE
1005.17 07/11

QUADRUPLE BOX CULVERTS
40 TO 50 FT. FILLS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

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(Requires a special design at this time)



ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1

REVISION DATE

1006.01

07/11

WING DETAILS

1½:1 FILL SLOPE - TYPE I

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION
REFERENCE

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(Requires a special design at this time)

SPECIFICATION REFERENCE	<p style="text-align: center;">WING DETAILS 1½:1 FILL SLOPE - TYPE I VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p style="text-align: center;">VDOT ROAD AND BRIDGE STANDARDS</p>	<p style="text-align: right;">SHEET 1 OF 1</p>

GENERAL NOTES

Specifications:

AASHTO LRFD Bridge Design Specifications 4th Edition 2007; 2008 and 2009 Interim Revisions; and VDOT Modifications

Limits of validity for Standard Wingwall design

The standard wingwall designs are based on the following assumptions:

there is no structural connection between the wall and the box culvert
traffic surcharge loading is neglected.

Backfill

Backfill shall comprise granular material with an internal friction angle Φ' of at least 32°. Cohesive backfill shall not be permitted. Compaction of the backfill material within a distance of one-half the height of the wall shall be by hand compactors only.

Drainage

The Contractor shall provide the drainage system indicated on Sheet 1.

The cost for the drainage system (including porous backfill, 6" diameter non-rigid tubing and other items required) shall be incidental to the cost bid for Concrete.

Concrete

All concrete shall be Class A4.

Reinforcement

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The concrete cover to the outermost reinforcement bars shall be as follows:

Wall footing (all faces) 3" minimum cover
Wall stem (all faces) 2 1/2" minimum cover

At the Contractor's option WV Series bars may be spliced at top of the footing in order to facilitate construction. Splice lengths shall be in accordance with Table C on Sheet 1. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Miscellaneous

Weepholes shall be placed at the lowest point feasible for free drainage away from the wing.

Four Type I Wings are to be used for straight crossings and skewers up to 20°. Two Type I and two Type II Wings are to be used for skewers from 25° to 45°. For skewers above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Wall Quantities	
	Concrete CY	Reinforcement LB
A	2.5	210
B	3.1	260
C	3.7	300
D	4.5	340
E	5.4	410
F	6.2	450
G	7.0	520
H	7.7	550
I	8.9	660
J	9.9	710
K	10.9	810
L	11.8	880
M	12.9	1030
N	13.8	1140
O	15.0	1210
P	16.6	1410
Q	17.6	1580
R	19.1	1700
S	20.4	1870
T	22.0	2020
U	23.5	2350
V	25.1	2600
W	27.1	2830
X	33.0	3350
Y	38.9	3850
Z	41.9	4130
AA	44.2	4480
BB	46.1	5030
CC	48.5	5260
DD	60.4	6430
EE	63.4	7070

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ROAD AND BRIDGE STANDARDS

SHEET 1 OF 8

REVISION DATE

1007.01

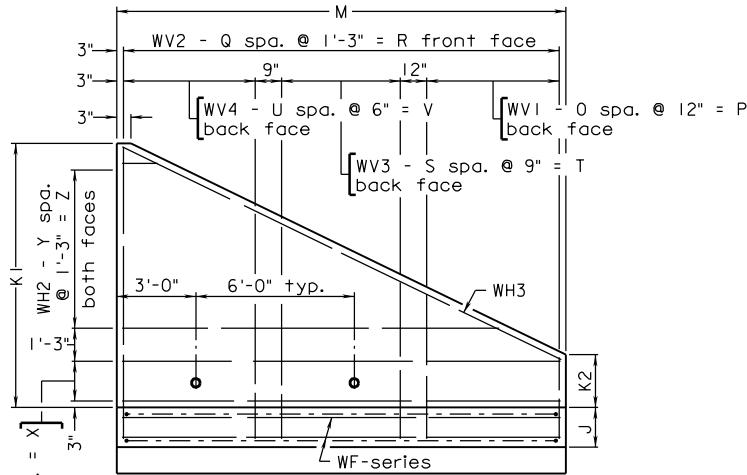
07/11

WING DETAIL

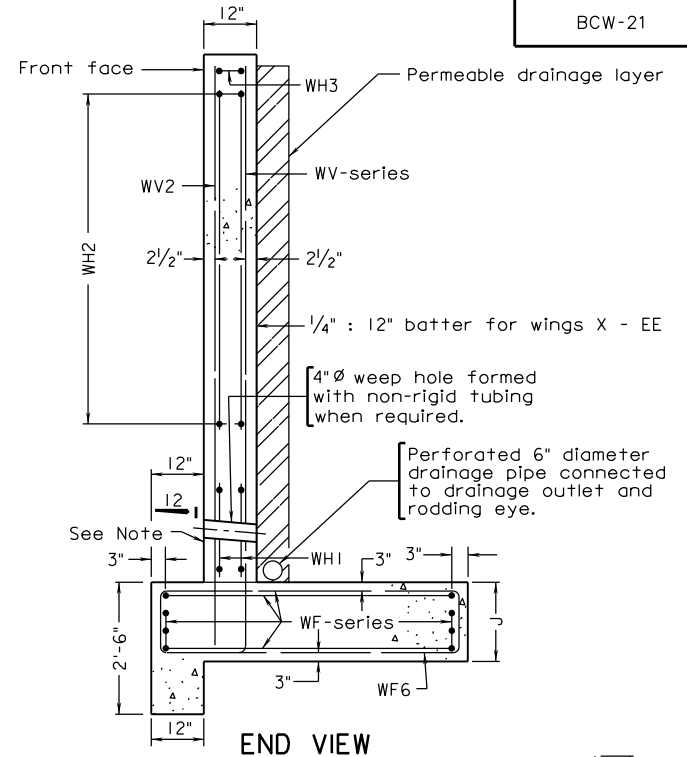
2:1 FILL SLOPE - TYPE I

VIRGINIA DEPARTMENT OF TRANSPORTATION

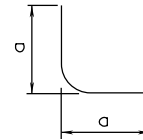
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REFERENCE



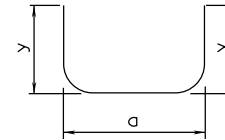
FRONT ELEVATION



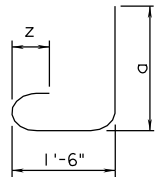
END VIEW



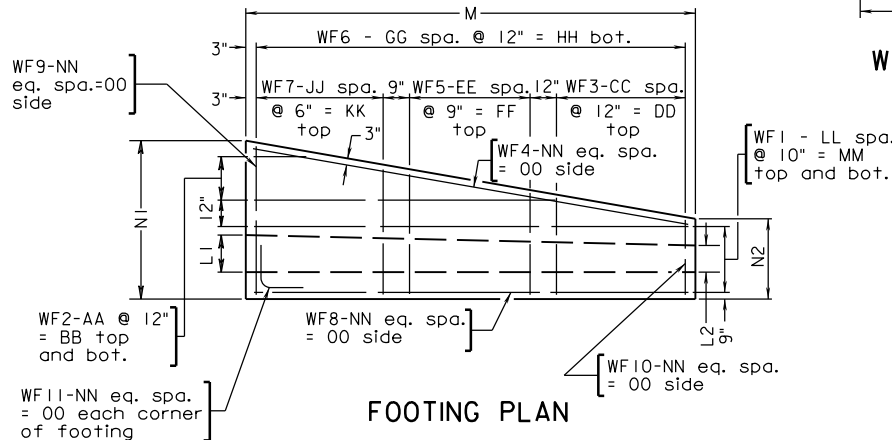
WF11



WF1 TO WF3, WF5 TO WF7



WV1, WV3, WV4



FOOTING PLAN

TABLE A	
Wall	y
A-W	9 1/2"
X	1'-0 1/2"
Y-CC	1'-3 1/2"
DD-EE	1'-9 1/2"

TABLE B		
Bar Size	Pin Dia.	Z
#3	2 1/4"	4"
#4	3"	4 1/2"
#5	3 3/4"	5"
#6	4 1/2"	6"
#7	5 1/4"	7"
#8	6"	8"
#9	9"	10 7/8"

TABLE C	
Bar Size	Splice Length
#4	1'- 9"
#5	2'- 4"
#6	2'- 7"
#7	3'- 3"
#8	4'- 2"
#9	5'- 4"

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SPECIFICATION REFERENCE

WING DETAIL
2: 1 FILL SLOPE - TYPE I
 VIRGINIA DEPARTMENT OF TRANSPORTATION



ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 2 OF 8

07/11 1007.02

WING	WALL DIMENSIONS								No. WEEP HOLES	FOOTING BAR SPACINGS													
	J	K1	K2	L1	L2	M	N1	N2		WF1		WF2		WF3		WF4, WF8 to WF11		WF5		WF6		WF7	
										LL	MM	AA	BB	CC	DD	NN	OO	EE	FF	GG	HH	JJ	KK
A	1'-6"	4'-0"	1'-6"	1'-0"	1'-0"	7'-0"	5'-0"	3'-0"	-	3	2'-6"	-	-	6	6'-0"	1	0'-8"	-	-	6	6'-0"	-	-
B	1'-6"	4'-6"	1'-6"	1'-0"	1'-0"	8'-0"	5'-6"	3'-0"	-	3	2'-6"	1	1'-0"	7	7'-0"	1	0'-8"	-	-	7	7'-0"	-	-
C	1'-6"	5'-0"	1'-9"	1'-0"	1'-0"	9'-0"	6'-0"	3'-0"	-	3	2'-6"	1	1'-0"	8	8'-0"	1	0'-8"	-	-	8	8'-0"	-	-
D	1'-6"	5'-6"	1'-9"	1'-0"	1'-0"	10'-0"	6'-6"	3'-6"	-	3	2'-6"	2	2'-0"	9	9'-0"	1	0'-8"	-	-	9	9'-0"	-	-
E	1'-6"	6'-0"	2'-0"	1'-0"	1'-0"	11'-0"	7'-0"	4'-0"	-	4	3'-4"	1	1'-0"	10	10'-0"	1	0'-8"	-	-	10	10'-0"	-	-
F	1'-6"	6'-6"	2'-0"	1'-0"	1'-0"	12'-0"	7'-6"	4'-0"	-	4	3'-4"	2	2'-0"	11	11'-0"	1	0'-8"	-	-	11	11'-0"	-	-
G	1'-6"	7'-0"	2'-3"	1'-0"	1'-0"	13'-0"	8'-0"	4'-0"	-	4	3'-4"	2	2'-0"	12	12'-0"	1	0'-8"	-	-	12	12'-0"	-	-
H	1'-6"	7'-6"	2'-3"	1'-0"	1'-0"	14'-0"	8'-0"	4'-0"	-	4	3'-4"	2	2'-0"	13	13'-0"	1	0'-8"	-	-	13	13'-0"	-	-
I	1'-6"	8'-0"	2'-6"	1'-0"	1'-0"	15'-0"	8'-6"	4'-6"	-	4	3'-4"	3	3'-0"	9	9'-0"	1	0'-8"	6	4'-6"	14	14'-0"	-	-
J	1'-6"	8'-6"	2'-6"	1'-0"	1'-0"	16'-0"	9'-0"	4'-6"	-	4	3'-4"	3	3'-0"	9	9'-0"	1	0'-8"	7	5'-3"	15	15'-0"	-	-
K	1'-6"	9'-0"	2'-9"	1'-0"	1'-0"	17'-0"	9'-6"	4'-6"	-	4	3'-4"	4	4'-0"	10	10'-0"	1	0'-8"	7	5'-3"	16	16'-0"	-	-
L	1'-6"	9'-6"	2'-9"	1'-0"	1'-0"	18'-0"	9'-6"	4'-6"	-	4	3'-4"	4	4'-0"	10	10'-0"	1	0'-8"	8	6'-0"	17	17'-0"	-	-
M	1'-6"	10'-0"	3'-0"	1'-0"	1'-0"	19'-0"	10'-0"	4'-6"	-	4	3'-4"	4	4'-0"	11	11'-0"	1	0'-8"	8	6'-0"	18	18'-0"	-	-
N	1'-6"	10'-6"	3'-6"	1'-0"	1'-0"	19'-0"	10'-6"	5'-0"	-	5	4'-2"	4	4'-0"	11	11'-0"	1	0'-8"	8	6'-0"	18	18'-0"	-	-
O	1'-6"	11'-0"	3'-6"	1'-0"	1'-0"	20'-0"	11'-0"	5'-0"	1	5	4'-2"	4	4'-0"	12	12'-0"	1	0'-8"	8	6'-0"	19	19'-0"	-	-
P	1'-6"	11'-6"	3'-9"	1'-0"	1'-0"	21'-0"	11'-6"	5'-6"	1	6	5'-0"	4	4'-0"	12	12'-0"	1	0'-8"	10	7'-6"	20	20'-0"	-	-
Q	1'-6"	12'-0"	3'-9"	1'-0"	1'-0"	22'-0"	11'-6"	5'-6"	1	6	5'-0"	4	4'-0"	13	13'-0"	1	0'-8"	10	7'-6"	21	21'-0"	-	-
R	1'-6"	12'-6"	4'-0"	1'-0"	1'-0"	23'-0"	12'-0"	5'-6"	1	6	5'-0"	5	5'-0"	10	10'-0"	1	0'-8"	9	6'-9"	22	22'-0"	8	4'-0"
S	1'-6"	13'-0"	4'-0"	1'-0"	1'-0"	24'-0"	12'-6"	5'-6"	1	6	5'-0"	5	5'-0"	11	11'-0"	1	0'-8"	9	6'-9"	23	23'-0"	8	4'-0"
T	1'-6"	13'-6"	4'-3"	1'-0"	1'-0"	25'-0"	12'-6"	6'-0"	2	6	5'-0"	5	5'-0"	12	12'-0"	1	0'-8"	9	6'-9"	24	24'-0"	8	4'-0"
U	1'-6"	14'-0"	4'-3"	1'-0"	1'-0"	26'-0"	13'-0"	6'-0"	2	6	5'-0"	6	6'-0"	12	12'-0"	1	0'-8"	9	6'-9"	25	25'-0"	10	5'-0"
V	1'-6"	14'-6"	4'-6"	1'-0"	1'-0"	27'-0"	13'-6"	6'-0"	2	6	5'-0"	6	6'-0"	10	10'-0"	1	0'-8"	13	9'-9"	26	26'-0"	10	5'-0"
W	1'-6"	15'-0"	4'-6"	1'-0"	1'-0"	28'-0"	14'-0"	6'-6"	2	7	5'-10"	6	6'-0"	11	11'-0"	1	0'-8"	13	9'-9"	27	27'-0"	10	5'-0"
X	1'-9"	15'-6"	4'-9"	1'-3 3/4"	1'-1 1/8"	29'-0"	15'-0"	6'-6"	2	7	5'-10"	7	7'-0"	11	11'-0"	1	0'-11"	13	9'-9"	28	28'-0"	12	6'-0"
Y	2'-0"	16'-0"	4'-9"	1'-4"	1'-1 1/8"	30'-0"	16'-0"	7'-0"	3	7	5'-10"	8	8'-0"	10	10'-0"	2	0'-7"	17	12'-9"	29	29'-0"	10	5'-0"
Z	2'-0"	16'-6"	5'-0"	1'-4 1/8"	1'-1 1/4"	31'-0"	16'-6"	7'-6"	3	8	6'-8"	7	7'-0"	10	10'-0"	2	0'-7"	17	12'-9"	30	30'-0"	12	6'-0"
AA	2'-0"	17'-0"	5'-0"	1'-4 1/4"	1'-1 1/4"	32'-0"	17'-0"	7'-6"	3	8	6'-8"	8	8'-0"	11	11'-0"	2	0'-7"	17	12'-9"	31	31'-0"	12	6'-0"
BB	2'-0"	17'-6"	5'-3"	1'-4 3/8"	1'-1 1/4"	33'-0"	17'-0"	7'-6"	3	8	6'-8"	8	8'-0"	12	12'-0"	2	0'-7"	17	12'-9"	32	32'-0"	12	6'-0"
CC	2'-0"	18'-0"	5'-3"	1'-4 1/2"	1'-1 1/4"	34'-0"	17'-6"	7'-6"	3	8	6'-8"	8	8'-0"	13	13'-0"	2	0'-7"	17	12'-9"	33	33'-0"	12	6'-0"
DD	2'-6"	18'-6"	5'-6"	1'-4 5/8"	1'-1 3/8"	35'-0"	18'-6"	8'-0"	4	9	7'-6"	9	9'-0"	12	12'-0"	2	0'-10"	17	12'-9"	34	34'-0"	16	8'-0"
EE	2'-6"	19'-0"	5'-6"	1'-4 3/4"	1'-1 3/8"	36'-0"	19'-0"	8'-0"	4	9	7'-6"	9	9'-0"	12	12'-0"	2	0'-10"	17	12'-9"	35	35'-0"	18	9'-0"

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VDOT
ROAD AND BRIDGE STANDARDS

SHEET 3 OF 8 REVISION DATE
1007.03 07/11

WING DETAILS
2:1 FILL SLOPE -TYPE I

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

WING	WF 1				WF 2							WF 3							
	SIZE	a		* E _a	SIZE	a			LENGTH			* E _a	SIZE	a			LENGTH		
		FROM	TO			VARY BY	FROM	TO	VARY BY	FROM	TO			VARY BY	FROM	TO	VARY BY		
A	4	6'-5"	7'-9"	2	4	3'-9"	3'-9"	-	5'-2"	5'-2"	-	2	4	4'-4"	2'-8"	0'-3 ³ / ₈ "	5'-9"	4'-0"	0'-3 ³ / ₈ "
B	4	7'-5"	8'-9"	2	4	5'-0"	1'-9"	3'-2 ³ / ₈ "	6'-4"	3'-2"	3'-2 ³ / ₈ "	2	4	4'-10"	2'-8"	0'-3 ³ / ₄ "	6'-3"	4'-0"	0'-3 ³ / ₄ "
C	4	8'-4"	9'-9"	2	4	6'-2"	3'-2"	3'-0"	7'-6"	4'-6"	3'-0"	2	4	5'-4"	2'-8"	0'-4"	6'-9"	4'-1"	0'-3"
D	4	9'-4"	10'-9"	2	4	8'-6"	1'-11"	3'-3 ¹ / ₈ "	9'-11"	3'-3"	3'-3 ¹ / ₈ "	2	4	5'-10"	3'-2"	0'-3 ¹ / ₂ "	7'-3"	4'-6"	0'-3 ¹ / ₂ "
E	4	10'-4"	11'-9"	2	4	8'-3"	4'-7"	3'-7 ¹ / ₈ "	9'-7"	5'-11"	3'-7 ¹ / ₈ "	2	4	6'-4"	3'-7"	0'-3 ¹ / ₄ "	7'-9"	5'-0"	0'-3 ¹ / ₄ "
F	4	11'-4"	12'-9"	2	4	9'-4"	2'-6"	3'-5 ¹ / ₈ "	10'-9"	3'-11"	3'-5 ¹ / ₈ "	2	4	6'-10"	3'-8"	0'-3 ¹ / ₂ "	8'-3"	5'-0"	0'-3 ¹ / ₂ "
G	4	12'-4"	13'-9"	2	4	10'-6"	4'-0"	3'-2 ¹ / ₈ "	11'-10"	5'-4"	3'-2 ¹ / ₈ "	2	4	7'-4"	3'-8"	0'-3 ³ / ₈ "	8'-9"	5'-0"	0'-3 ³ / ₈ "
H	4	13'-4"	14'-9"	2	4	11'-4"	4'-4"	3'-6"	12'-8"	5'-8"	3'-6"	2	4	7'-4"	3'-8"	0'-3 ³ / ₈ "	8'-9"	5'-0"	0'-3 ³ / ₈ "
I	4	14'-4"	15'-9"	2	4	14'-1"	2'-10"	3'-9"	15'-5"	4'-2"	3'-9"	2	4	6'-5"	4'-0"	0'-3 ¹ / ₈ "	7'-9"	5'-4"	0'-3 ¹ / ₈ "
J	4	15'-4"	16'-9"	2	4	15'-1"	4'-5"	3'-6 ⁵ / ₈ "	16'-5"	5'-9"	3'-6 ⁵ / ₈ "	2	4	6'-7"	4'-1"	0'-3 ³ / ₈ "	8'-9"	5'-5"	0'-3 ³ / ₈ "
K	4	16'-5"	17'-9"	2	4	16'-1"	2'-6"	3'-4 ³ / ₄ "	17'-6"	3'-10"	3'-4 ³ / ₄ "	2	4	7'-0"	4'-1"	0'-3 ¹ / ₂ "	8'-5"	5'-5"	0'-3 ¹ / ₂ "
L	4	17'-5"	18'-9"	2	4	17'-1"	2'-8"	3'-7 ¹ / ₈ "	18'-5"	4'-1"	3'-7 ¹ / ₈ "	2	4	6'-11"	4'-2"	0'-3 ¹ / ₄ "	8'-3"	5'-6"	0'-3 ¹ / ₄ "
M	4	18'-5"	19'-9"	2	4	18'-1"	4'-3"	3'-5 ³ / ₈ "	19'-6"	5'-8"	3'-5 ³ / ₈ "	2	4	7'-4"	4'-2"	0'-3 ³ / ₈ "	8'-8"	5'-6"	0'-3 ³ / ₈ "
N	4	18'-5"	19'-9"	2	4	16'-11"	3'-1"	3'-5 ³ / ₈ "	18'-4"	4'-6"	3'-5 ³ / ₈ "	2	4	7'-10"	4'-8"	0'-3 ³ / ₈ "	9'-2"	6'-0"	0'-3 ³ / ₈ "
O	4	19'-5"	20'-9"	2	4	18'-0"	4'-8"	3'-4"	19'-4"	6'-0"	3'-4"	2	4	8'-3"	4'-8"	0'-3 ¹ / ₂ "	9'-7"	6'-0"	0'-3 ¹ / ₂ "
P	4	20'-5"	21'-9"	2	4	17'-9"	3'-9"	3'-6"	19'-2"	5'-1"	3'-6"	2	4	8'-5"	5'-0"	0'-3 ³ / ₈ "	9'-10"	6'-4"	0'-3 ³ / ₈ "
Q	4	21'-5"	22'-9"	2	4	18'-8"	4'-0"	3'-8"	20'-0"	5'-4"	3'-8"	2	4	8'-6"	5'-0"	0'-3 ¹ / ₄ "	9'-11"	6'-4"	0'-3 ¹ / ₄ "
R	4	22'-5"	23'-9"	2	4	19'-9"	2'-0"	3'-6 ³ / ₈ "	21'-1"	3'-5"	3'-6 ³ / ₈ "	2	4	7'-10"	5'-0"	0'-3 ³ / ₈ "	9'-2"	6'-4"	0'-3 ³ / ₈ "
S	4	23'-5"	24'-9"	2	4	20'-10"	3'-8"	3'-5 ¹ / ₈ "	22'-2"	5'-0"	3'-5 ¹ / ₈ "	2	4	8'-2"	5'-0"	0'-3 ¹ / ₂ "	9'-7"	6'-4"	0'-3 ¹ / ₂ "
T	4	24'-5"	25'-9"	2	4	23'-5"	4'-2"	3'-10 ¹ / ₈ "	24'-9"	5'-7"	3'-10 ¹ / ₈ "	2	4	8'-7"	5'-6"	0'-3"	10'-0"	6'-10"	0'-3"
U	4	25'-5"	26'-9"	2	4	24'-5"	2'-2"	3'-8 ¹ / ₂ "	25'-10"	3'-6"	3'-8 ¹ / ₂ "	2	4	8'-9"	5'-6"	0'-3 ¹ / ₈ "	10'-1"	6'-10"	0'-3 ¹ / ₈ "
V	4	26'-5"	27'-9"	2	4	25'-6"	3'-11"	3'-7 ¹ / ₈ "	26'-10"	5'-3"	3'-7 ¹ / ₈ "	2	4	8'-3"	5'-6"	0'-3 ¹ / ₄ "	9'-8"	6'-10"	0'-3 ¹ / ₄ "
W	4	27'-5"	28'-9"	2	4	25'-2"	2'-10"	3'-8 ³ / ₄ "	26'-7"	4'-2"	3'-8 ³ / ₄ "	2	4	8'-11"	6'-0"	0'-3 ¹ / ₈ "	10'-4"	7'-4"	0'-3 ¹ / ₈ "
X	4	28'-5"	30'-3"	2	5	26'-5"	2'-6"	3'-4 ⁷ / ₈ "	28'-2"	4'-4"	3'-4 ⁷ / ₈ "	2	5	9'-3"	6'-0"	0'-3 ¹ / ₂ "	11'-0"	7'-10"	0'-3 ¹ / ₂ "
Y	4	29'-5"	31'-9"	2	5	29'-1"	2'-5"	3'-4"	31'-5"	4'-9"	3'-4"	2	5	9'-6"	6'-6"	0'-3 ¹ / ₂ "	11'-10"	8'-10"	0'-3 ¹ / ₂ "
Z	4	30'-5"	32'-9"	2	5	28'-11"	4'-10"	3'-5 ¹ / ₄ "	31'-3"	7'-2"	3'-5 ¹ / ₄ "	2	5	9'-11"	7'-0"	0'-3 ³ / ₈ "	12'-3"	9'-4"	0'-3 ³ / ₈ "
AA	4	31'-5"	33'-9"	2	5	30'-0"	3'-0"	3'-4 ³ / ₈ "	32'-4"	5'-4"	3'-4 ³ / ₈ "	2	5	10'-3"	7'-0"	0'-3 ¹ / ₂ "	12'-7"	9'-4"	0'-3 ¹ / ₂ "
BB	4	32'-4"	34'-9"	2	5	30'-11"	3'-2"	3'-5 ⁵ / ₈ "	33'-3"	5'-6"	3'-5 ⁵ / ₈ "	2	5	10'-5"	7'-0"	0'-3 ³ / ₈ "	12'-9"	9'-4"	0'-3 ³ / ₈ "
CC	4	33'-4"	35'-9"	2	5	32'-1"	4'-9"	3'-4 ³ / ₄ "	34'-3"	7'-1"	3'-4 ³ / ₄ "	2	5	10'-10"	7'-0"	0'-3 ¹ / ₂ "	13'-2"	9'-4"	0'-3 ¹ / ₂ "
DD	5	34'-4"	37'-8"	2	5	31'-11"	1'-11"	3'-4"	35'-2"	5'-2"	3'-4"	2	5	11'-1"	7'-6"	0'-3 ¹ / ₂ "	14'-5"	10'-10"	0'-3 ¹ / ₂ "
EE	5	35'-4"	38'-8"	2	5	32'-11"	3'-6"	3'-3 ¹ / ₄ "	36'-3"	6'-9"	3'-3 ¹ / ₄ "	2	5	11'-2"	7'-6"	0'-3 ³ / ₈ "	14'-6"	10'-10"	0'-3 ³ / ₈ "

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2: 1 FILL SLOPE -TYPE I</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>		<p style="margin: 0;">ROAD AND BRIDGE STANDARDS</p>
	REVISION DATE	SHEET 4 OF 8	
	07/11	1007.04	

WING	WF4			WF5						WF6						
	SIZE	LENGTH	SIZE	α			LENGTH			SIZE	α			LENGTH		
				FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY	FROM	TO	VARY BY
A	4	6'-5"	-	-	-	-	-	-	4	4'-4"	2'-7"	0'- 3 ³ / ₈ "	5'-8"	4'-0"	0'- 3 ³ / ₈ "	
B	4	7'-6"	-	-	-	-	-	-	4	4'-10"	2'-7"	0'- 3 ³ / ₄ "	6'-2"	4'-0"	0'- 3 ³ / ₄ "	
C	4	8'-8"	-	-	-	-	-	-	4	5'-4"	2'-8"	0'- 4"	6'-8"	4'-0"	0'- 4"	
D	4	9'-7"	-	-	-	-	-	-	4	5'-10"	3'-1"	0'- 3 ¹ / ₂ "	7'-2"	4'-6"	0'- 3 ¹ / ₂ "	
E	4	10'-7"	-	-	-	-	-	-	4	6'-4"	3'-7"	0'- 3 ¹ / ₄ "	7'-8"	4'-11"	0'- 3 ¹ / ₄ "	
F	4	11'-8"	-	-	-	-	-	-	4	6'-10"	3'-7"	0'- 3 ¹ / ₂ "	8'-2"	5'-0"	0'- 3 ¹ / ₂ "	
G	4	12'-9"	-	-	-	-	-	-	4	7'-4"	3'-7"	0'- 3 ⁵ / ₈ "	8'-8"	5'-0"	0'- 3 ⁵ / ₈ "	
H	4	13'-8"	-	-	-	-	-	-	4	7'-4"	3'-7"	0'- 3 ³ / ₈ "	8'-8"	5'-0"	0'- 3 ³ / ₈ "	
I	4	14'-8"	4	7'-10"	6'-8"	0'- 2 ³ / ₈ "	9'-3"	8'-0"	0'- 2 ³ / ₈ "	4	7'-10"	4'-1"	0'- 3 ¹ / ₈ "	9'-2"	5'-5"	0'- 3 ¹ / ₈ "
J	4	15'-9"	4	8'-4"	6'-10"	0'- 2 ¹ / ₂ "	9'-9"	8'-3"	0'- 2 ¹ / ₂ "	4	8'-4"	4'-1"	0'- 3 ³ / ₈ "	9'-8"	5'-6"	0'- 3 ³ / ₈ "
K	4	16'-10"	4	8'-10"	7'-4"	0'- 2 ⁵ / ₈ "	10'-3"	8'-8"	0'- 2 ⁵ / ₈ "	4	8'-10"	4'-1"	0'- 3 ¹ / ₂ "	10'-2"	5'-6"	0'- 3 ¹ / ₂ "
L	4	17'-10"	4	8'-10"	7'-2"	0'- 2 ¹ / ₂ "	10'-3"	8'-7"	0'- 2 ¹ / ₂ "	4	8'-10"	4'-1"	0'- 3 ¹ / ₄ "	10'-2"	5'-5"	0'- 3 ¹ / ₄ "
M	4	18'-11"	5	9'-4"	7'-7"	0'- 2 ¹ / ₂ "	10'-8"	8'-11"	0'- 2 ¹ / ₂ "	4	9'-4"	4'-1"	0'- 3 ³ / ₈ "	10'-8"	5'-6"	0'- 3 ³ / ₈ "
N	4	18'-11"	5	9'-10"	8'-1"	0'- 2 ¹ / ₂ "	11'-2"	9'-5"	0'- 2 ¹ / ₂ "	4	9'-10"	4'-7"	0'- 3 ³ / ₈ "	11'-2"	6'-0"	0'- 3 ³ / ₈ "
O	4	20'-0"	5	10'-4"	8'-7"	0'- 2 ⁵ / ₈ "	11'-8"	9'-10"	0'- 2 ⁵ / ₈ "	4	10'-4"	4'-7"	0'- 3 ¹ / ₂ "	11'-8"	6'-0"	0'- 3 ¹ / ₂ "
P	4	21'-0"	6	10'-10"	8'-8"	0'- 2 ¹ / ₂ "	12'-1"	10'-0"	0'- 2 ¹ / ₂ "	4	10'-10"	5'-1"	0'- 3 ³ / ₈ "	12'-2"	6'-6"	0'- 3 ³ / ₈ "
Q	4	21'-11"	6	10'-10"	8'-10"	0'- 2 ³ / ₈ "	12'-1"	10'-1"	0'- 2 ³ / ₈ "	4	10'-10"	5'-1"	0'- 3 ¹ / ₄ "	12'-2"	6'-5"	0'- 3 ¹ / ₄ "
R	4	23'-1"	5	10'-0"	8'-1"	0'- 2 ¹ / ₂ "	11'-4"	9'-5"	0'- 2 ¹ / ₂ "	4	11'-4"	5'-1"	0'- 3 ³ / ₈ "	12'-8"	6'-6"	0'- 3 ³ / ₈ "
S	4	24'-2"	5	10'-6"	8'-6"	0'- 2 ⁵ / ₈ "	11'-9"	9'-10"	0'- 2 ⁵ / ₈ "	4	11'-10"	5'-1"	0'- 3 ¹ / ₂ "	13'-2"	6'-6"	0'- 3 ¹ / ₂ "
T	4	25'-0"	6	10'-7"	8'-10"	0'- 2 ¹ / ₄ "	11'-11"	10'-2"	0'- 2 ¹ / ₄ "	4	11'-10"	5'-7"	0'- 3"	13'-2"	6'-11"	0'- 3"
U	4	26'-1"	6	10'-10"	9'-0"	0'- 2 ³ / ₈ "	12'-1"	10'-3"	0'- 2 ³ / ₈ "	4	12'-4"	5'-7"	0'- 3 ¹ / ₈ "	13'-8"	6'-11"	0'- 3 ¹ / ₈ "
V	4	27'-2"	6	11'-3"	8'-6"	0'- 2 ¹ / ₂ "	12'-6"	9'-10"	0'- 2 ¹ / ₂ "	4	12'-10"	5'-7"	0'- 3 ¹ / ₄ "	14'-2"	7'-1"	0'- 3 ¹ / ₄ "
W	4	28'-2"	7	11'-10"	9'-2"	0'- 2 ³ / ₈ "	13'-0"	10'-5"	0'- 2 ³ / ₈ "	4	13'-4"	6'-1"	0'- 3 ¹ / ₈ "	14'-8"	7'-5"	0'- 3 ¹ / ₈ "
X	4	29'-4"	6	12'-4"	9'-6"	0'- 2 ⁵ / ₈ "	14'-2"	11'-3"	0'- 2 ⁵ / ₈ "	5	14'-4"	6'-1"	0'- 3 ¹ / ₂ "	16'-1"	7'-11"	0'- 3 ¹ / ₂ "
Y	4	30'-6"	6	13'-7"	9'-10"	0'- 2 ⁵ / ₈ "	15'-11"	12'-1"	0'- 2 ⁵ / ₈ "	5	15'-4"	6'-7"	0'- 3 ¹ / ₂ "	17'-7"	8'-11"	0'- 3 ¹ / ₂ "
Z	4	31'-5"	6	13'-11"	10'-2"	0'- 2 ¹ / ₂ "	16'-2"	12'-5"	0'- 2 ¹ / ₂ "	5	15'-10"	7'-1"	0'- 3 ³ / ₈ "	18'-2"	9'-5"	0'- 3 ³ / ₈ "
AA	4	32'-6"	7	14'-4"	10'-7"	0'- 2 ⁵ / ₈ "	16'-7"	12'-9"	0'- 2 ⁵ / ₈ "	5	16'-4"	7'-1"	0'- 3 ¹ / ₂ "	18'-7"	9'-5"	0'- 3 ¹ / ₂ "
BB	4	33'-6"	7	14'-5"	10'-9"	0'- 2 ¹ / ₂ "	16'-7"	12'-11"	0'- 2 ¹ / ₂ "	5	16'-4"	7'-1"	0'- 3 ³ / ₈ "	18'-8"	9'-5"	0'- 3 ³ / ₈ "
CC	4	34'-7"	7	14'-10"	11'-1"	0'- 2 ⁵ / ₈ "	17'-1"	13'-4"	0'- 2 ⁵ / ₈ "	5	16'-10"	7'-1"	0'- 3 ¹ / ₂ "	19'-1"	9'-5"	0'- 3 ¹ / ₂ "
DD	5	35'-8"	7	15'-3"	11'-5"	0'- 2 ⁵ / ₈ "	18'-5"	14'-7"	0'- 2 ⁵ / ₈ "	5	17'-10"	7'-7"	0'- 3 ¹ / ₂ "	21'-1"	10'-11"	0'- 3 ¹ / ₂ "
EE	5	36'-9"	7	15'-4"	11'-6"	0'- 2 ³ / ₄ "	18'-7"	14'-8"	0'- 2 ³ / ₄ "	5	18'-4"	7'-7"	0'- 3 ⁵ / ₈ "	21'-7"	10'-11"	0'- 3 ⁵ / ₈ "

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE



ROAD AND BRIDGE STANDARDS

SHEET 5 OF 8

REVISION DATE

1007.05

07/11

WING DETAILS

2:1 FILL SLOPE - TYPE I

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

WING	WF7							WF8		WF9		WF10		WF11			
	SIZE	α			LENGTH			SIZE	LENGTH	SIZE	LENGTH	SIZE	LENGTH	SIZE	α	LENGTH	• Eα
		FROM	TO	VARY BY	FROM	TO	VARY BY										
A	-	-	-	-	-	-	-	4	6'-2"	4	4'-2"	4	2'-2"	4	2'-2"	4'-2"	4
B	-	-	-	-	-	-	-	4	7'-2"	4	4'-8"	4	2'-2"	4	2'-2"	4'-2"	4
C	-	-	-	-	-	-	-	4	8'-1"	4	5'-2"	4	2'-2"	4	2'-2"	4'-2"	4
D	-	-	-	-	-	-	-	4	9'-1"	4	5'-8"	4	2'-8"	4	2'-2"	4'-2"	4
E	-	-	-	-	-	-	-	4	10'-1"	4	6'-2"	4	3'-2"	4	2'-2"	4'-2"	4
F	-	-	-	-	-	-	-	4	11'-1"	4	6'-8"	4	3'-2"	4	2'-2"	4'-2"	4
G	-	-	-	-	-	-	-	4	12'-1"	4	7'-2"	4	3'-2"	4	2'-2"	4'-2"	4
H	-	-	-	-	-	-	-	4	13'-1"	4	7'-2"	4	3'-2"	4	2'-2"	4'-2"	4
I	-	-	-	-	-	-	-	4	14'-1"	4	7'-8"	4	3'-8"	4	2'-2"	4'-2"	4
J	-	-	-	-	-	-	-	4	15'-1"	4	8'-1"	4	3'-8"	4	2'-2"	4'-2"	4
K	-	-	-	-	-	-	-	4	16'-2"	4	8'-7"	4	3'-8"	4	2'-2"	4'-2"	4
L	-	-	-	-	-	-	-	4	17'-2"	4	8'-7"	4	3'-8"	4	2'-2"	4'-2"	4
M	-	-	-	-	-	-	-	4	18'-2"	4	9'-1"	4	3'-8"	4	2'-2"	4'-2"	4
N	-	-	-	-	-	-	-	4	18'-2"	4	9'-7"	4	4'-2"	4	2'-2"	4'-2"	4
O	-	-	-	-	-	-	-	4	19'-2"	4	10'-1"	4	4'-2"	4	2'-2"	4'-2"	4
P	-	-	-	-	-	-	-	4	20'-2"	4	10'-7"	4	4'-8"	4	2'-2"	4'-2"	4
Q	-	-	-	-	-	-	-	4	21'-2"	4	10'-7"	4	4'-8"	4	2'-2"	4'-2"	4
R	5	11'-4"	10'-3"	0'-1 ⁵ / ₈ "	12'-8"	11'-6"	0'-1 ⁵ / ₈ "	4	22'-2"	4	11'-1"	4	4'-8"	4	2'-2"	4'-2"	4
S	6	11'-10"	10'-8"	0'-1 ³ / ₄ "	13'-1"	11'-11"	0'-1 ³ / ₄ "	4	23'-2"	4	11'-7"	4	4'-8"	4	2'-2"	4'-2"	4
T	6	11'-10"	10'-10"	0'-1 ¹ / ₂ "	13'-1"	12'-1"	0'-1 ¹ / ₂ "	4	24'-2"	4	11'-7"	4	5'-2"	4	2'-2"	4'-2"	4
U	6	12'-4"	11'-0"	0'-1 ¹ / ₂ "	13'-7"	12'-3"	0'-1 ¹ / ₂ "	4	25'-2"	4	12'-1"	4	5'-2"	4	2'-2"	4'-2"	4
V	6	12'-10"	11'-6"	0'-1 ⁵ / ₈ "	14'-1"	12'-9"	0'-1 ⁵ / ₈ "	4	26'-2"	4	12'-7"	4	5'-2"	4	2'-2"	4'-2"	4
W	6	13'-4"	12'-0"	0'-1 ¹ / ₂ "	14'-7"	13'-3"	0'-1 ¹ / ₂ "	4	27'-2"	4	13'-1"	4	5'-8"	4	2'-2"	4'-2"	4
X	6	14'-4"	12'-7"	0'-1 ³ / ₄ "	16'-1"	14'-4"	0'-1 ³ / ₄ "	4	28'-2"	4	14'-1"	4	5'-8"	4	2'-2"	4'-2"	4
Y	7	15'-4"	13'-10"	0'-1 ³ / ₄ "	17'-7"	16'-1"	0'-1 ³ / ₄ "	4	29'-2"	4	15'-1"	4	6'-2"	4	2'-2"	4'-2"	4
Z	7	15'-10"	14'-1"	0'-1 ⁵ / ₈ "	18'-1"	16'-4"	0'-1 ⁵ / ₈ "	4	30'-2"	4	15'-7"	4	6'-8"	4	2'-2"	4'-2"	4
AA	7	16'-4"	14'-7"	0'-1 ³ / ₄ "	18'-7"	16'-9"	0'-1 ³ / ₄ "	4	31'-2"	4	16'-2"	4	6'-8"	4	2'-2"	4'-2"	4
BB	7	16'-4"	14'-7"	0'-1 ⁵ / ₈ "	18'-7"	16'-10"	0'-1 ⁵ / ₈ "	4	32'-1"	4	16'-2"	4	6'-8"	4	2'-2"	4'-2"	4
CC	7	16'-10"	15'-1"	0'-1 ³ / ₄ "	19'-1"	17'-4"	0'-1 ³ / ₄ "	4	33'-1"	4	16'-8"	4	6'-8"	4	2'-2"	4'-2"	4
DD	7	17'-10"	15'-5"	0'-1 ³ / ₄ "	21'-1"	18'-8"	0'-1 ³ / ₄ "	5	34'-1"	5	17'-8"	5	7'-2"	5	2'-9"	5'-4"	4
EE	7	18'-4"	15'-7"	0'-1 ³ / ₄ "	21'-7"	18'-10"	0'-1 ³ / ₄ "	5	35'-1"	5	18'-2"	5	7'-2"	5	2'-9"	5'-4"	4

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SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2: 1 FILL SLOPE - TYPE I</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p style="margin: 0;">ROAD AND BRIDGE STANDARDS</p>	
		REVISION DATE	SHEET 6 OF 8
		07/11	1007.06

WING	STEM BAR SPACINGS												WV1						WV2					
	WV1		WV2		WV3		WV4		WH1		WH2		SIZE	α			LENGTH			SIZE	LENGTH			
	0	P	Q	R	S	T	U	V	W	X	Y	Z		FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY	
A	6	6'-0"	5	6'-3"	-	-	-	-	-	-	1	1'-3"	4	4'-11"	2'-9"	0'-4 1/4"	6'-10"	4'-8"	0'-4 1/4"	4	4'-11"	2'-8"	0'-5 3/8"	
B	7	7'-0"	6	7'-6"	-	-	-	-	1	0'-6"	1	1'-3"	4	5'-5"	2'-9"	0'-4 1/2"	7'-4"	4'-8"	0'-4 1/2"	4	5'-5"	2'-7"	0'-5 5/8"	
C	8	8'-0"	6	7'-6"	-	-	-	-	1	1'-0"	1	1'-3"	4	5'-11"	3'-0"	0'-4 1/4"	7'-10"	4'-11"	0'-4 1/4"	4	5'-11"	3'-2"	0'-5 3/8"	
D	9	9'-0"	7	8'-9"	-	-	-	-	-	-	2	2'-6"	4	6'-5"	3'-0"	0'-4 1/2"	8'-4"	4'-11"	0'-4 1/2"	4	6'-5"	3'-1"	0'-5 5/8"	
E	10	10'-0"	8	10'-0"	-	-	-	-	1	0'-9"	2	2'-6"	4	6'-11"	3'-3"	0'-4 3/8"	8'-10"	5'-2"	0'-4 3/8"	4	6'-11"	3'-3"	0'-5 3/8"	
F	11	11'-0"	9	11'-3"	-	-	-	-	1	1'-3"	2	2'-6"	4	7'-5"	3'-3"	0'-4 1/2"	9'-4"	5'-2"	0'-4 1/2"	4	7'-5"	3'-2"	0'-5 5/8"	
G	12	12'-0"	10	12'-6"	-	-	-	-	2	1'-9"	2	2'-6"	4	7'-11"	3'-6"	0'-4 3/8"	9'-10"	5'-5"	0'-4 3/8"	4	7'-11"	3'-4"	0'-5 1/2"	
H	13	13'-0"	10	12'-6"	-	-	-	-	1	1'-0"	3	3'-9"	4	8'-5"	3'-6"	0'-4 1/2"	10'-4"	5'-5"	0'-4 1/2"	4	8'-5"	3'-8"	0'-5 5/8"	
I	9	9'-0"	11	13'-9"	6	4'-6"	-	-	2	1'-6"	3	3'-9"	4	6'-11"	3'-7"	0'-4 3/8"	8'-9"	5'-6"	0'-4 3/8"	4	8'-11"	3'-10"	0'-5 1/2"	
J	9	9'-0"	12	15'-0"	7	5'-3"	-	-	2	2'-0"	3	3'-9"	4	7'-1"	3'-8"	0'-4 1/2"	8'-11"	5'-7"	0'-4 1/2"	4	9'-5"	3'-9"	0'-5 5/8"	
K	10	10'-0"	13	16'-3"	7	5'-3"	-	-	1	1'-3"	4	5'-0"	4	7'-7"	3'-11"	0'-4 3/8"	9'-6"	5'-10"	0'-4 3/8"	4	9'-11"	3'-11"	0'-5 1/2"	
L	10	10'-0"	14	17'-6"	8	6'-0"	-	-	2	1'-9"	4	5'-0"	4	7'-9"	4'-0"	0'-4 1/2"	9'-8"	5'-11"	0'-4 1/2"	4	10'-5"	3'-10"	0'-5 5/8"	
M	11	11'-0"	14	17'-6"	8	6'-0"	-	-	2	2'-3"	4	5'-0"	4	8'-4"	4'-3"	0'-4 3/8"	10'-3"	6'-2"	0'-4 3/8"	4	10'-11"	4'-5"	0'-5 1/2"	
N	11	11'-0"	14	17'-6"	8	6'-0"	-	-	3	2'-9"	4	5'-0"	5	8'-10"	4'-9"	0'-4 3/8"	10'-9"	6'-8"	0'-4 3/8"	4	11'-5"	4'-11"	0'-5 1/2"	
O	12	12'-0"	15	18'-9"	8	6'-0"	-	-	2	2'-0"	5	6'-3"	5	9'-3"	4'-9"	0'-4 1/2"	11'-3"	6'-8"	0'-4 1/2"	4	11'-11"	4'-10"	0'-5 5/8"	
P	12	12'-0"	16	20'-0"	10	7'-6"	-	-	2	2'-6"	5	6'-3"	5	9'-3"	4'-10"	0'-4 3/8"	11'-3"	6'-9"	0'-4 3/8"	4	12'-5"	5'-0"	0'-5 1/2"	
Q	13	13'-0"	17	21'-3"	10	7'-6"	-	-	3	3'-0"	5	6'-3"	5	9'-9"	4'-10"	0'-4 1/2"	11'-8"	6'-9"	0'-4 1/2"	4	12'-11"	4'-11"	0'-5 5/8"	
R	10	10'-0"	18	22'-6"	9	6'-9"	8	4'-0"	3	3'-6"	5	6'-3"	5	8'-9"	5'-1"	0'-4 3/8"	10'-9"	7'-0"	0'-4 3/8"	4	13'-5"	5'-1"	0'-5 1/2"	
S	11	11'-0"	18	22'-6"	9	6'-9"	8	4'-0"	3	2'-9"	6	7'-6"	5	9'-3"	5'-1"	0'-4 1/2"	11'-2"	7'-0"	0'-4 1/2"	4	13'-11"	5'-5"	0'-5 5/8"	
T	12	12'-0"	19	23'-9"	9	6'-9"	8	4'-0"	3	3'-3"	6	7'-6"	5	9'-9"	5'-4"	0'-4 3/8"	11'-9"	7'-3"	0'-4 3/8"	4	14'-5"	5'-7"	0'-5 1/2"	
U	12	12'-0"	20	25'-0"	9	6'-9"	10	5'-0"	3	3'-9"	6	7'-6"	5	9'-10"	5'-4"	0'-4 1/2"	11'-9"	7'-3"	0'-4 1/2"	4	14'-11"	5'-6"	0'-5 5/8"	
V	10	10'-0"	21	26'-3"	13	9'-9"	10	5'-0"	3	3'-0"	7	8'-9"	5	9'-3"	5'-7"	0'-4 3/8"	11'-3"	7'-6"	0'-4 3/8"	4	15'-5"	5'-8"	0'-5 1/2"	
W	11	11'-0"	22	27'-6"	13	9'-9"	10	5'-0"	3	3'-6"	7	8'-9"	5	9'-9"	5'-7"	0'-4 1/2"	11'-8"	7'-6"	0'-4 1/2"	4	15'-11"	5'-7"	0'-5 5/8"	
X	11	11'-0"	22	27'-6"	13	9'-9"	12	6'-0"	4	4'-0"	7	8'-9"	5	10'-2"	6'-1"	0'-4 3/8"	12'-1"	8'-0"	0'-4 3/8"	4	16'-8"	6'-5"	0'-5 1/2"	
Y	10	10'-0"	23	28'-9"	17	12'-9"	10	5'-0"	3	3'-3"	8	10'-0"	5	10'-1"	6'-4"	0'-4 1/2"	12'-0"	8'-3"	0'-4 1/2"	4	17'-5"	6'-7"	0'-5 5/8"	
Z	10	10'-0"	24	30'-0"	17	12'-9"	12	6'-0"	3	3'-9"	8	10'-0"	5	10'-4"	6'-7"	0'-4 3/8"	12'-3"	8'-6"	0'-4 3/8"	4	17'-11"	6'-9"	0'-5 1/2"	
AA	11	11'-0"	25	31'-3"	17	12'-9"	12	6'-0"	4	4'-3"	8	10'-0"	5	10'-9"	6'-7"	0'-4 1/2"	12'-8"	8'-6"	0'-4 1/2"	4	18'-5"	6'-8"	0'-5 5/8"	
BB	12	12'-0"	26	32'-6"	17	12'-9"	12	6'-0"	4	4'-9"	8	10'-0"	6	11'-3"	6'-10"	0'-4 3/8"	13'-4"	8'-10"	0'-4 3/8"	4	18'-11"	6'-10"	0'-5 1/2"	
CC	13	13'-0"	26	32'-6"	17	12'-9"	12	6'-0"	4	4'-0"	9	11'-3"	6	11'-9"	6'-10"	0'-4 1/2"	13'-9"	8'-10"	0'-4 1/2"	4	19'-5"	7'-2"	0'-5 5/8"	
DD	12	12'-0"	27	33'-9"	17	12'-9"	16	8'-0"	4	4'-6"	9	11'-3"	6	12'-0"	7'-7"	0'-4 3/8"	14'-1"	9'-7"	0'-4 3/8"	4	20'-5"	7'-10"	0'-5 1/2"	
EE	12	12'-0"	28	35'-0"	17	12'-9"	18	9'-0"	4	5'-0"	9	11'-3"	6	12'-1"	7'-7"	0'-4 1/2"	14'-1"	9'-7"	0'-4 1/2"	4	20'-11"	7'-9"	0'-5 5/8"	

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VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 7 OF 8	REVISION DATE
1007.07	07/11

WING DETAILS
2:1 FILL SLOPE - TYPE I
VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

WING	WV3							WV4							WH1			WH2				WH3		
	SIZE	a			LENGTH			SIZE	a			LENGTH			SIZE	LENGTH	* Ea	SIZE	LENGTH			SIZE	LENGTH	
		FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY	FROM	TO	VARY BY					FROM	TO	VARY BY			* EA
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6'-6"	2	4	6'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	6'-11"
B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7'-6"	2	4	5'-9"	2'-6"	3'-2 ¹ / ₂ "	2	4	8'-1"
C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	8'-6"	2	4	6'-0"	2'-7"	3'-4 ¹ / ₄ "	2	4	9'-1"
D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	9'-6"	2	4	9'-1"	2'-6"	3'-3 ¹ / ₄ "	2	4	10'-1"
E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	10'-6"	2	4	9'-4"	2'-7"	3'-4 ¹ / ₈ "	2	4	11'-1"
F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	11'-6"	2	4	9'-1"	2'-6"	3'-3 ¹ / ₈ "	2	4	12'-4"
G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	12'-6"	2	4	9'-4"	2'-7"	3'-4 ¹ / ₄ "	2	4	13'-4"
H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	13'-6"	2	4	12'-4"	2'-6"	3'-3 ³ / ₈ "	2	4	14'-4"
I	4	8'-11"	7'-3"	0'-3 ¹ / ₄ "	10'-10"	9'-2"	0'-3 ¹ / ₄ "	-	-	-	-	-	-	-	4	14'-6"	2	4	12'-7"	2'-7"	3'-4 ¹ / ₈ "	2	4	15'-6"
J	4	9'-5"	7'-5"	0'-3 ³ / ₈ "	11'-4"	9'-4"	0'-3 ³ / ₈ "	-	-	-	-	-	-	-	4	15'-6"	2	4	12'-4"	2'-6"	3'-3 ³ / ₈ "	2	4	16'-6"
K	5	9'-11"	8'-0"	0'-3 ¹ / ₄ "	11'-10"	9'-11"	0'-3 ¹ / ₄ "	-	-	-	-	-	-	-	4	16'-6"	2	4	16'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	17'-6"
L	5	10'-5"	8'-2"	0'-3 ³ / ₈ "	12'-4"	10'-1"	0'-3 ³ / ₈ "	-	-	-	-	-	-	-	4	17'-6"	2	4	15'-9"	2'-7"	3'-3 ¹ / ₂ "	2	4	18'-9"
M	6	10'-11"	8'-8"	0'-3 ¹ / ₄ "	12'-11"	10'-9"	0'-3 ¹ / ₄ "	-	-	-	-	-	-	-	4	18'-6"	2	4	16'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	19'-9"
N	6	11'-5"	9'-2"	0'-3 ¹ / ₄ "	13'-5"	11'-3"	0'-3 ¹ / ₄ "	-	-	-	-	-	-	-	4	18'-6"	2	4	16'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	19'-9"
O	6	11'-11"	9'-8"	0'-3 ³ / ₈ "	13'-11"	11'-8"	0'-3 ³ / ₈ "	-	-	-	-	-	-	-	4	19'-6"	2	4	19'-0"	2'-6"	3'-3 ⁵ / ₈ "	2	4	20'-9"
P	6	12'-5"	9'-8"	0'-3 ¹ / ₄ "	14'-5"	11'-8"	0'-3 ¹ / ₄ "	-	-	-	-	-	-	-	4	20'-6"	2	4	19'-3"	2'-7"	3'-4 ¹ / ₈ "	2	4	21'-11"
Q	7	12'-11"	10'-1"	0'-3 ³ / ₈ "	15'-0"	12'-3"	0'-3 ³ / ₈ "	-	-	-	-	-	-	-	4	21'-6"	2	4	19'-0"	2'-6"	3'-3 ⁵ / ₈ "	2	4	23'-0"
R	6	11'-8"	9'-2"	0'-3 ¹ / ₄ "	13'-8"	11'-2"	0'-3 ¹ / ₄ "	6	13'-5"	11'-11"	0'-2 ¹ / ₈ "	15'-5"	14'-0"	0'-2 ¹ / ₈ "	4	22'-6"	2	4	19'-3"	2'-7"	3'-4 ¹ / ₈ "	2	4	24'-0"
S	6	12'-2"	9'-7"	0'-3 ³ / ₈ "	14'-2"	11'-7"	0'-3 ³ / ₈ "	6	13'-11"	12'-5"	0'-2 ¹ / ₄ "	15'-11"	14'-5"	0'-2 ¹ / ₄ "	4	23'-6"	2	4	22'-5"	2'-7"	3'-3 ⁵ / ₈ "	2	4	25'-2"
T	6	12'-8"	10'-2"	0'-3 ¹ / ₄ "	14'-8"	12'-2"	0'-3 ¹ / ₄ "	6	14'-5"	12'-11"	0'-2 ¹ / ₈ "	16'-5"	15'-0"	0'-2 ¹ / ₈ "	4	24'-6"	2	4	22'-8"	2'-7"	3'-4 ¹ / ₈ "	2	4	26'-2"
U	7	12'-9"	10'-3"	0'-3 ³ / ₈ "	14'-10"	12'-4"	0'-3 ³ / ₈ "	7	14'-11"	13'-0"	0'-2 ¹ / ₄ "	17'-0"	15'-2"	0'-2 ¹ / ₄ "	4	25'-6"	2	4	22'-5"	2'-7"	3'-3 ⁵ / ₈ "	2	4	27'-3"
V	7	13'-3"	9'-8"	0'-3 ¹ / ₄ "	15'-5"	11'-9"	0'-3 ¹ / ₄ "	7	15'-5"	13'-7"	0'-2 ¹ / ₈ "	17'-6"	15'-8"	0'-2 ¹ / ₈ "	4	26'-6"	2	4	26'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	28'-3"
W	7	13'-9"	10'-1"	0'-3 ³ / ₈ "	15'-10"	12'-2"	0'-3 ³ / ₈ "	7	15'-11"	14'-0"	0'-2 ¹ / ₄ "	18'-0"	16'-2"	0'-2 ¹ / ₄ "	4	27'-6"	2	4	25'-9"	2'-6"	3'-3 ³ / ₄ "	2	4	29'-5"
X	7	14'-2"	10'-6"	0'-3 ¹ / ₄ "	16'-3"	12'-8"	0'-3 ¹ / ₄ "	7	16'-8"	14'-5"	0'-2 ¹ / ₈ "	18'-9"	16'-7"	0'-2 ¹ / ₈ "	4	28'-6"	2	4	26'-0"	2'-7"	3'-4 ¹ / ₈ "	2	4	30'-5"
Y	7	15'-3"	10'-6"	0'-3 ³ / ₈ "	17'-4"	12'-7"	0'-3 ³ / ₈ "	7	17'-5"	15'-6"	0'-2 ¹ / ₄ "	19'-6"	17'-8"	0'-2 ¹ / ₄ "	4	29'-6"	2	4	29'-0"	2'-7"	3'-3 ³ / ₄ "	2	4	31'-6"
Z	7	15'-5"	10'-8"	0'-3 ¹ / ₄ "	17'-6"	12'-9"	0'-3 ¹ / ₄ "	7	17'-11"	15'-8"	0'-2 ¹ / ₈ "	20'-0"	17'-10"	0'-2 ¹ / ₈ "	4	30'-6"	2	4	29'-3"	2'-7"	3'-4 ¹ / ₈ "	2	4	32'-7"
AA	7	15'-11"	11'-1"	0'-3 ³ / ₈ "	18'-0"	13'-2"	0'-3 ³ / ₈ "	7	18'-5"	16'-2"	0'-2 ¹ / ₄ "	20'-6"	18'-3"	0'-2 ¹ / ₄ "	4	31'-6"	2	4	29'-0"	2'-7"	3'-3 ³ / ₄ "	2	4	33'-7"
BB	8	16'-5"	11'-8"	0'-3 ¹ / ₄ "	18'-7"	13'-10"	0'-3 ¹ / ₄ "	8	18'-11"	16'-8"	0'-2 ¹ / ₈ "	21'-1"	18'-11"	0'-2 ¹ / ₈ "	4	32'-6"	2	4	29'-3"	2'-7"	3'-4 ¹ / ₈ "	2	4	34'-7"
CC	8	16'-11"	12'-1"	0'-3 ³ / ₈ "	19'-1"	14'-4"	0'-3 ³ / ₈ "	8	19'-5"	17'-2"	0'-2 ¹ / ₄ "	21'-7"	19'-4"	0'-2 ¹ / ₄ "	4	33'-6"	2	4	32'-4"	2'-7"	3'-3 ³ / ₄ "	2	4	35'-10"
DD	8	17'-2"	12'-5"	0'-3 ¹ / ₄ "	19'-4"	14'-7"	0'-3 ¹ / ₄ "	8	20'-5"	17'-5"	0'-2 ¹ / ₈ "	22'-7"	19'-8"	0'-2 ¹ / ₈ "	4	34'-6"	2	4	32'-7"	2'-8"	3'-4"	2	4	36'-10"
EE	8	17'-3"	12'-6"	0'-3 ³ / ₈ "	19'-6"	14'-8"	0'-3 ³ / ₈ "	9	20'-11"	17'-6"	0'-2 ¹ / ₄ "	23'-4"	20'-0"	0'-2 ¹ / ₄ "	4	35'-6"	2	4	32'-4"	2'-7"	3'-3 ³ / ₄ "	2	4	37'-11"

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SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2: 1 FILL SLOPE - TYPE I</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p style="margin: 0;">ROAD AND BRIDGE STANDARDS</p>	
		REVISION DATE	SHEET 8 OF 8
		07/11	1007.08

GENERAL NOTES

Specifications:

AASHTO LRFD Bridge Design Specifications 4th Edition 2007; 2008 and 2009 Interim Revisions; and VDOT Modifications

Limits of validity for Standard Wingwall design

The standard wingwall designs are based on the following assumptions:

there is no structural connection between the wall and the box culvert
traffic surcharge loading is neglected.

Backfill

Backfill shall comprise granular material with an internal friction angle Φ' of at least 32°. Cohesive backfill shall not be permitted. Compaction of the backfill material within a distance of one-half the height of the wall shall be by hand compactors only.

Drainage

The Contractor shall provide the drainage system indicated on Sheet 2.

The cost for the drainage system (including porous backfill, 6" diameter non-rigid tubing and other items required) shall be incidental to the cost bid for Concrete.

Concrete

All concrete shall be Class A4.

Reinforcement

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawings are to centers of bars except where otherwise noted and are subject to fabrication and construction tolerances.

Dimensions on bar diagrams are out-to-out of bars. Bars are straight unless otherwise shown.

The concrete cover to the outermost reinforcement bars shall be as follows:

Wall footing (all faces) 3" minimum cover
Wall stem (all faces) 2 1/2" minimum cover

At the Contractor's option, WV Series bars may be spliced at top of the footing in order to facilitate construction. Splice lengths shall be in accordance with Table C on Sheet 2. No additional compensation shall be provided for the increase in reinforcing steel quantity due to the splices.

Miscellaneous

Weepholes shall be placed at the lowest point feasible for free drainage away from the wing.

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I and two Type II Wings are to be used for skews from 25° to 45°. For skews above 45°, special design wings are required. The wingwall to be used for each culvert is shown on the BC series sheets.

The designs shown are applicable for a 45° skew with the roadway and other conditions indicated. Any change in these conditions invalidates these designs.

Quantities shown are for one wing.

WING	Wall Quantities	
	Concrete CY	Reinforcement LB
A	3.2	260
B	3.9	330
C	4.6	360
D	5.5	410
E	6.4	490
F	7.5	550
G	8.6	630
H	9.5	680
I	10.5	750
J	11.8	860
K	13.1	980
L	14.2	1080
M	15.7	1270
N	17.2	1420
O	18.5	1540
P	20.1	1730
Q	21.4	2010
R	23.2	2080
S	25.1	2350
T	26.5	2560
U	28.1	2810
V	30.1	3040
W	35.0	3630
X	43.0	4130
Y	46.6	4710
Z	49.5	5070
AA	52.0	5400
BB	54.2	5860
CC	57.4	6270
DD	61.6	6820
EE	64.9	7720

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ROAD AND BRIDGE STANDARDS

SHEET 1 OF 8

REVISION DATE

1007.09

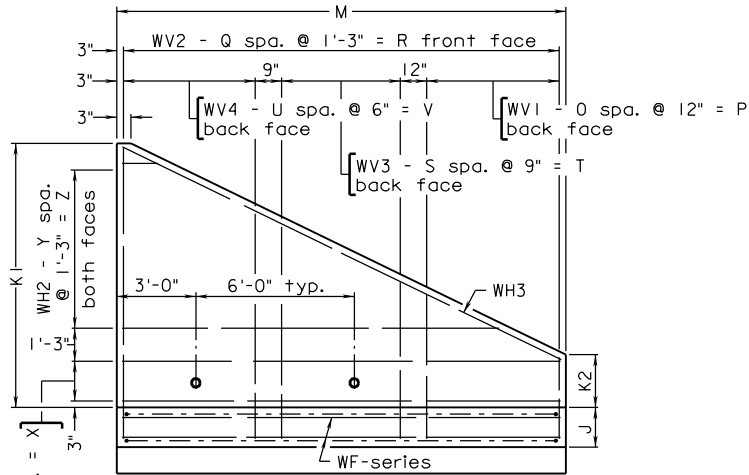
07/11

WING DETAIL

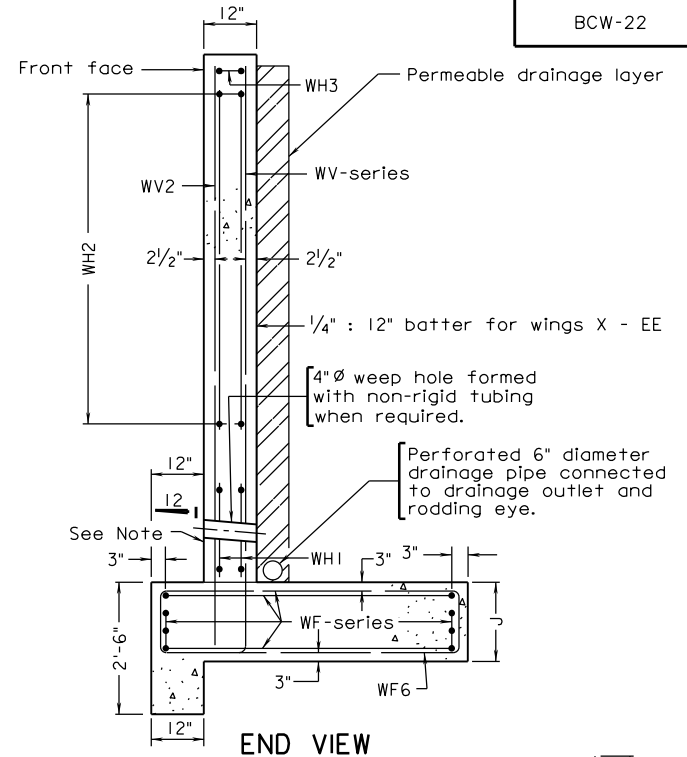
2:1 FILL SLOPE - TYPE II

VIRGINIA DEPARTMENT OF TRANSPORTATION

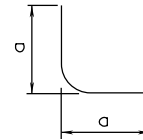
SPECIFICATION
REFERENCE



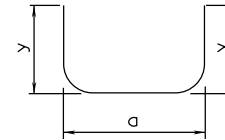
FRONT ELEVATION



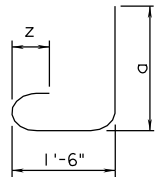
END VIEW



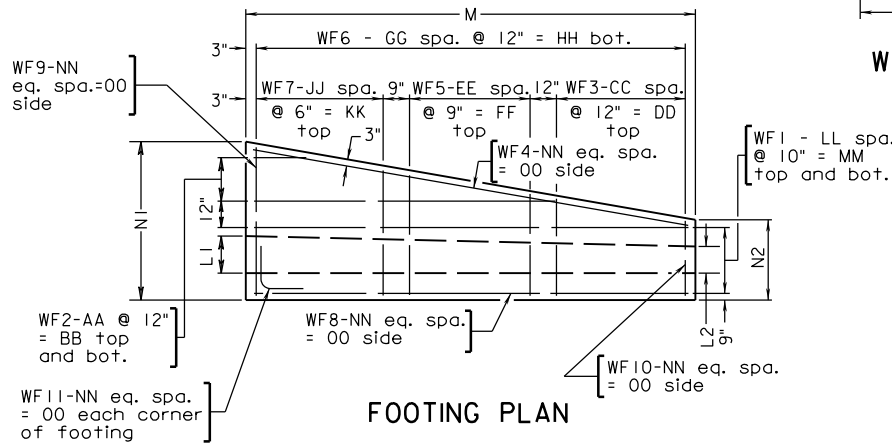
WF11



WF1 TO WF3, WF5 TO WF7



WV1, WV3, WV4



FOOTING PLAN

TABLE A	
Wall	y
A-W	9 1/2"
X	1'-0 1/2"
Y-CC	1'-3 1/2"
DD-EE	1'-9 1/2"

TABLE B		
Bar Size	Pin Dia.	Z
#3	2 1/4"	4"
#4	3"	4 1/2"
#5	3 3/4"	5"
#6	4 1/2"	6"
#7	5 1/4"	7"
#8	6"	8"
#9	9"	10 1/8"

TABLE C	
Bar Size	Splice Length
#4	1'- 9"
#5	2'- 4"
#6	2'- 7"
#7	3'- 3"
#8	4'- 2"
#9	5'- 4"

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SPECIFICATION REFERENCE

WING DETAIL
2: 1 FILL SLOPE - TYPE I
 VIRGINIA DEPARTMENT OF TRANSPORTATION




ROAD AND BRIDGE STANDARDS

REVISION DATE SHEET 2 OF 8

07/11 1007.10

WING	J	K1	K2	L1	L2	M	N1	N2	NO. WEEP HOLES	FOOTING BAR SPACINGS													
										WF1		WF2		WF3		WF4, WF8 TO WF11		WF5		WF6		WF7	
										LL	MM	AA	BB	CC	DD	NN	OO	EE	FF	GG	HH	JJ	KK
A	1'-6"	4'-0"	1'-0"	1'-0"	1'-0"	9'-0"	5'-0"	3'-0"	-	3	2'-6"	-	-	8	8'-0"	1	0'-8"	-	-	8	8'-0"	-	-
B	1'-6"	4'-6"	1'-0"	1'-0"	1'-0"	10'-6"	5'-6"	3'-0"	-	3	2'-6"	1	1'-0"	10	10'-0"	1	0'-8"	-	-	10	10'-0"	-	-
C	1'-6"	5'-0"	1'-0"	1'-0"	1'-0"	11'-6"	6'-0"	3'-0"	-	3	2'-6"	1	1'-0"	11	11'-0"	1	0'-8"	-	-	11	11'-0"	-	-
D	1'-6"	5'-6"	1'-0"	1'-0"	1'-0"	13'-0"	6'-6"	3'-0"	-	3	2'-6"	2	2'-0"	12	12'-0"	1	0'-8"	-	-	12	12'-0"	-	-
E	1'-6"	6'-0"	1'-0"	1'-0"	1'-0"	14'-6"	7'-0"	3'-0"	-	3	2'-6"	2	2'-0"	14	14'-0"	1	0'-8"	-	-	14	14'-0"	-	-
F	1'-6"	6'-6"	1'-0"	1'-0"	1'-0"	16'-0"	7'-6"	3'-0"	-	3	2'-6"	3	3'-0"	15	15'-0"	1	0'-8"	-	-	15	15'-0"	-	-
G	1'-6"	7'-0"	1'-0"	1'-0"	1'-0"	17'-6"	8'-0"	3'-0"	-	3	2'-6"	3	3'-0"	17	17'-0"	1	0'-8"	-	-	17	17'-0"	-	-
H	1'-6"	7'-6"	1'-0"	1'-0"	1'-0"	19'-0"	8'-0"	3'-0"	-	3	2'-6"	3	3'-0"	18	18'-0"	1	0'-8"	-	-	18	18'-0"	-	-
I	1'-6"	8'-0"	1'-0"	1'-0"	1'-0"	20'-0"	8'-6"	3'-0"	-	3	2'-6"	4	4'-0"	12	12'-0"	1	0'-8"	8	6'-0"	19	19'-0"	-	-
J	1'-6"	8'-6"	1'-0"	1'-0"	1'-0"	21'-6"	9'-0"	3'-0"	-	3	2'-6"	4	4'-0"	12	12'-0"	1	0'-8"	10	7'-6"	21	21'-0"	-	-
K	1'-6"	9'-0"	1'-0"	1'-0"	1'-0"	23'-0"	9'-6"	3'-0"	-	3	2'-6"	5	5'-0"	13	13'-0"	1	0'-8"	11	8'-3"	22	22'-0"	-	-
L	1'-6"	9'-6"	1'-0"	1'-0"	1'-0"	24'-6"	9'-6"	3'-0"	-	3	2'-6"	5	5'-0"	14	14'-0"	1	0'-8"	12	9'-0"	24	24'-0"	-	-
M	1'-6"	10'-0"	1'-0"	1'-0"	1'-0"	26'-0"	10'-0"	3'-0"	2	3	2'-6"	5	5'-0"	15	15'-0"	1	0'-8"	12	9'-0"	25	25'-0"	-	-
N	1'-6"	10'-6"	1'-0"	1'-0"	1'-0"	27'-6"	10'-6"	3'-0"	2	3	2'-6"	6	6'-0"	16	16'-0"	1	0'-8"	13	9'-9"	27	27'-0"	-	-
O	1'-6"	11'-0"	1'-0"	1'-0"	1'-0"	28'-6"	11'-0"	3'-0"	2	3	2'-6"	6	6'-0"	17	17'-0"	1	0'-8"	13	9'-9"	28	28'-0"	-	-
P	1'-6"	11'-6"	1'-0"	1'-0"	1'-0"	30'-0"	11'-6"	3'-0"	3	3	2'-6"	7	7'-0"	18	18'-0"	1	0'-8"	14	10'-6"	29	29'-0"	-	-
Q	1'-6"	12'-0"	1'-0"	1'-0"	1'-0"	31'-6"	11'-6"	3'-0"	3	3	2'-6"	7	7'-0"	18	18'-0"	1	0'-8"	16	12'-0"	31	31'-0"	-	-
R	1'-6"	12'-6"	1'-0"	1'-0"	1'-0"	33'-0"	12'-0"	3'-0"	3	3	2'-6"	7	7'-0"	15	15'-0"	1	0'-8"	13	9'-9"	32	32'-0"	12	6'-0"
S	1'-6"	13'-0"	1'-0"	1'-0"	1'-0"	34'-6"	12'-6"	3'-0"	3	3	2'-6"	8	8'-0"	15	15'-0"	1	0'-8"	13	9'-9"	34	34'-0"	15	7'-6"
T	1'-6"	13'-6"	1'-0"	1'-0"	1'-0"	36'-0"	12'-6"	3'-0"	4	3	2'-6"	8	8'-0"	14	14'-0"	1	0'-8"	15	11'-3"	35	35'-0"	17	8'-6"
U	1'-6"	14'-0"	1'-0"	1'-0"	1'-0"	37'-0"	13'-0"	3'-0"	4	3	2'-6"	8	8'-0"	14	14'-0"	1	0'-8"	17	12'-9"	36	36'-0"	16	8'-0"
V	1'-6"	14'-6"	1'-0"	1'-0"	1'-0"	38'-6"	13'-6"	3'-0"	4	3	2'-6"	9	9'-0"	15	15'-0"	1	0'-8"	17	12'-9"	38	38'-0"	17	8'-6"
W	1'-9"	15'-0"	1'-0"	1'-0"	1'-0"	40'-0"	14'-0"	3'-0"	5	3	2'-6"	9	9'-0"	15	15'-0"	1	0'-11"	19	14'-3"	39	39'-0"	17	8'-6"
X	2'-0"	15'-6"	1'-0"	1'-3 ³ / ₄ "	1'-0 ¹ / ₄ "	41'-6"	15'-0"	3'-6"	5	3	2'-6"	10	10'-0"	17	17'-0"	2	0'-7"	17	12'-9"	41	41'-0"	19	9'-6"
Y	2'-0"	16'-0"	1'-0"	1'-4"	1'-0 ¹ / ₄ "	43'-0"	16'-0"	3'-6"	5	3	2'-6"	11	11'-0"	20	20'-0"	2	0'-7"	15	11'-3"	42	42'-0"	19	9'-6"
Z	2'-0"	16'-6"	1'-0"	1'-4 ¹ / ₈ "	1'-0 ¹ / ₄ "	44'-6"	16'-6"	3'-6"	5	3	2'-6"	12	12'-0"	20	20'-0"	2	0'-7"	17	12'-9"	44	44'-0"	19	9'-6"
AA	2'-0"	17'-0"	1'-0"	1'-4 ¹ / ₈ "	1'-0 ¹ / ₄ "	45'-6"	17'-0"	3'-6"	6	3	2'-6"	12	12'-0"	19	19'-0"	2	0'-7"	19	14'-3"	45	45'-0"	20	10'-0"
BB	2'-0"	17'-6"	1'-0"	1'-4 ³ / ₈ "	1'-0 ¹ / ₄ "	47'-0"	17'-0"	3'-6"	6	3	2'-6"	12	12'-0"	20	20'-0"	2	0'-7"	19	14'-3"	46	46'-0"	21	10'-6"
CC	2'-0"	18'-0"	1'-0"	1'-4 ¹ / ₂ "	1'-0 ¹ / ₄ "	48'-6"	17'-6"	3'-6"	6	3	2'-6"	13	13'-0"	19	19'-0"	2	0'-7"	21	15'-9"	48	48'-0"	23	11'-6"
DD	2'-0"	18'-6"	1'-0"	1'-4 ⁵ / ₈ "	1'-0 ¹ / ₄ "	50'-0"	18'-6"	3'-6"	7	3	2'-6"	14	14'-0"	18	18'-0"	2	0'-7"	23	17'-3"	49	49'-0"	25	12'-6"
EE	2'-0"	19'-0"	1'-0"	1'-4 ³ / ₄ "	1'-0 ¹ / ₄ "	51'-6"	19'-0"	3'-6"	7	3	2'-6"	14	14'-0"	18	18'-0"	2	0'-7"	25	18'-9"	51	51'-0"	25	12'-6"

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 ROAD AND BRIDGE STANDARDS	
SHEET 3 OF 8	REVISION DATE
1007.11	07/11

WING DETAILS
2:1 FILL SLOPE - TYPE II
 VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

WING	WF1				WF2								WF3							
	SIZE	α	LENGTH	• Eα	SIZE	α			LENGTH			• Eα	SIZE	α			LENGTH			
						FROM	TO	VARY BY	FROM	TO	VARY BY			FROM	TO	VARY BY	FROM	TO	VARY BY	
A	4	8'-4"	9'-9"	2	4	5'-0"	5'-0"	-	6'-5"	6'-5"	-	2	4	4'-4"	2'-7"	0'-2 ⁵ / ₈ "	5'-9"	4'-0"	0'-2 ⁵ / ₈ "	
B	4	9'-11"	11'-3"	2	4	6'-9"	2'-6"	4'-2 ³ / ₈ "	8'-1"	3'-11"	4'-2 ³ / ₈ "	2	4	4'-10"	2'-6"	0'-2 ³ / ₄ "	6'-3"	3'-10"	0'-2 ³ / ₄ "	
C	4	10'-11"	12'-3"	2	4	8'-0"	4'-2"	3'-9 ¹ / ₈ "	9'-4"	5'-7"	3'-9 ¹ / ₈ "	2	4	5'-4"	2'-6"	0'-3 ¹ / ₈ "	6'-9"	3'-10"	0'-3 ¹ / ₈ "	
D	4	12'-4"	13'-9"	2	4	9'-7"	2'-2"	3'-8 ¹ / ₂ "	11'-0"	3'-6"	3'-8 ¹ / ₂ "	2	4	5'-10"	2'-7"	0'-3 ¹ / ₈ "	7'-3"	4'-0"	0'-3 ¹ / ₈ "	
E	4	13'-11"	15'-3"	2	4	11'-2"	3'-11"	3'-7 ¹ / ₂ "	12'-6"	5'-3"	3'-7 ¹ / ₂ "	2	4	6'-4"	2'-6"	0'-3 ¹ / ₄ "	7'-9"	3'-10"	0'-3 ¹ / ₄ "	
F	4	15'-4"	16'-9"	2	4	12'-9"	2'-0"	3'-6 ⁵ / ₈ "	14'-1"	3'-5"	3'-6 ⁵ / ₈ "	2	4	6'-10"	2'-8"	0'-3 ³ / ₈ "	8'-3"	4'-0"	0'-3 ³ / ₈ "	
G	4	16'-11"	18'-3"	2	4	14'-3"	3'-9"	3'-6"	15'-7"	5'-1"	3'-6"	2	4	7'-4"	2'-6"	0'-3 ³ / ₈ "	8'-9"	3'-10"	0'-3 ³ / ₈ "	
H	4	18'-5"	19'-9"	2	4	15'-6"	4'-2"	3'-9 ¹ / ₂ "	16'-11"	5'-6"	3'-9 ¹ / ₂ "	2	4	7'-4"	2'-7"	0'-3 ¹ / ₈ "	8'-9"	4'-0"	0'-3 ¹ / ₈ "	
I	4	19'-5"	20'-9"	2	4	16'-8"	2'-1"	3'-7 ⁵ / ₈ "	18'-0"	3'-6"	3'-7 ⁵ / ₈ "	2	4	5'-11"	2'-7"	0'-3 ¹ / ₄ "	8'-4"	4'-0"	0'-3 ¹ / ₄ "	
J	4	20'-11"	22'-3"	2	4	18'-2"	3'-10"	3'-7"	19'-7"	5'-3"	3'-7"	2	4	6'-0"	2'-8"	0'-3 ¹ / ₄ "	7'-4"	4'-0"	0'-3 ¹ / ₄ "	
K	4	22'-5"	23'-9"	2	4	19'-9"	2'-0"	3'-6 ³ / ₈ "	21'-1"	3'-5"	3'-6 ³ / ₈ "	2	4	6'-3"	2'-7"	0'-3 ³ / ₈ "	7'-7"	3'-11"	0'-3 ³ / ₈ "	
L	4	23'-11"	25'-3"	2	4	21'-1"	2'-2"	3'-9 ¹ / ₈ "	22'-5"	3'-7"	3'-9 ¹ / ₈ "	2	4	6'-2"	2'-6"	0'-3 ¹ / ₈ "	7'-7"	3'-10"	0'-3 ¹ / ₈ "	
M	4	25'-5"	26'-9"	2	4	22'-7"	4'-0"	3'-8 ¹ / ₂ "	24'-0"	5'-5"	3'-8 ¹ / ₂ "	2	4	6'-8"	2'-7"	0'-3 ¹ / ₈ "	8'-0"	4'-0"	0'-3 ¹ / ₈ "	
N	4	26'-11"	28'-3"	2	4	24'-2"	2'-2"	3'-8"	25'-6"	3'-6"	3'-8"	2	4	6'-11"	2'-7"	0'-3 ¹ / ₄ "	8'-4"	3'-11"	0'-3 ¹ / ₄ "	
O	4	27'-11"	29'-3"	2	4	25'-2"	3'-10"	3'-6 ³ / ₄ "	26'-7"	5'-2"	3'-6 ³ / ₄ "	2	4	7'-4"	2'-7"	0'-3 ¹ / ₄ "	8'-8"	3'-11"	0'-3 ¹ / ₄ "	
P	4	29'-5"	30'-9"	2	4	26'-9"	2'-0"	3'-6 ¹ / ₄ "	28'-1"	3'-5"	3'-6 ¹ / ₄ "	2	4	7'-7"	2'-6"	0'-3 ³ / ₈ "	9'-0"	3'-10"	0'-3 ³ / ₈ "	
Q	4	30'-11"	32'-3"	2	4	28'-1"	2'-2"	3'-8 ³ / ₈ "	29'-6"	3'-6"	3'-8 ³ / ₈ "	2	4	7'-4"	2'-6"	0'-3 ¹ / ₈ "	8'-9"	3'-10"	0'-3 ¹ / ₈ "	
R	4	32'-4"	33'-9"	2	4	29'-8"	4'-0"	3'-8"	31'-0"	5'-4"	3'-8"	2	4	6'-7"	2'-6"	0'-3 ¹ / ₄ "	7'-11"	3'-10"	0'-3 ¹ / ₄ "	
S	4	33'-11"	35'-3"	2	4	31'-2"	2'-1"	3'-7 ¹ / ₂ "	32'-6"	3'-6"	3'-7 ¹ / ₂ "	2	4	6'-7"	2'-6"	0'-3 ¹ / ₄ "	8'-0"	3'-10"	0'-3 ¹ / ₄ "	
T	4	35'-4"	36'-9"	2	4	32'-6"	2'-3"	3'-9 ³ / ₈ "	33'-11"	3'-7"	3'-9 ³ / ₈ "	2	4	6'-2"	2'-6"	0'-3 ¹ / ₈ "	7'-7"	3'-10"	0'-3 ¹ / ₈ "	
U	4	36'-4"	37'-9"	2	4	33'-7"	4'-0"	3'-8 ³ / ₈ "	35'-0"	5'-5"	3'-8 ³ / ₈ "	2	4	6'-3"	2'-6"	0'-3 ¹ / ₈ "	7'-8"	3'-10"	0'-3 ¹ / ₈ "	
V	4	37'-11"	39'-3"	2	4	35'-1"	2'-2"	3'-8"	36'-6"	3'-6"	3'-8"	2	4	6'-7"	2'-6"	0'-3 ¹ / ₄ "	7'-11"	3'-10"	0'-3 ¹ / ₄ "	
W	4	39'-4"	41'-3"	2	5	36'-8"	3'-11"	3'-7 ⁵ / ₈ "	38'-6"	5'-9"	3'-7 ⁵ / ₈ "	2	5	6'-7"	2'-6"	0'-3 ¹ / ₄ "	8'-5"	4'-4"	0'-3 ¹ / ₄ "	
X	4	40'-11"	43'-3"	2	5	40'-0"	3'-11"	3'-7 ¹ / ₄ "	42'-4"	6'-3"	3'-7 ¹ / ₄ "	2	5	7'-8"	3'-0"	0'-3 ¹ / ₄ "	10'-0"	5'-4"	0'-3 ¹ / ₄ "	
Y	4	42'-4"	44'-9"	2	5	41'-6"	3'-8"	3'-5 ¹ / ₄ "	43'-10"	6'-0"	3'-5 ¹ / ₄ "	2	5	8'-10"	3'-0"	0'-3 ³ / ₈ "	11'-2"	5'-4"	0'-3 ³ / ₈ "	
Z	4	43'-11"	46'-3"	2	5	43'-0"	1'-11"	3'-5"	45'-4"	4'-3"	3'-5"	2	5	8'-10"	3'-0"	0'-3 ¹ / ₂ "	11'-2"	5'-4"	0'-3 ¹ / ₂ "	
AA	4	44'-11"	47'-3"	2	5	44'-0"	3'-7"	3'-4 ³ / ₈ "	46'-4"	5'-11"	3'-4 ³ / ₈ "	2	5	8'-8"	3'-0"	0'-3 ¹ / ₂ "	10'-11"	5'-4"	0'-3 ¹ / ₂ "	
BB	4	46'-4"	48'-9"	2	5	45'-6"	3'-9"	3'-5 ³ / ₄ "	47'-10"	6'-1"	3'-5 ³ / ₄ "	2	5	8'-9"	3'-0"	0'-3 ³ / ₈ "	11'-1"	5'-4"	0'-3 ³ / ₈ "	
CC	4	47'-11"	50'-3"	2	5	47'-0"	2'-0"	3'-5 ¹ / ₂ "	49'-4"	4'-4"	3'-5 ¹ / ₂ "	2	5	8'-6"	3'-0"	0'-3 ³ / ₈ "	10'-10"	5'-4"	0'-3 ³ / ₈ "	
DD	4	49'-4"	51'-9"	2	5	48'-6"	1'-11"	3'-4"	50'-10"	4'-2"	3'-4"	2	5	8'-5"	3'-0"	0'-3 ¹ / ₂ "	10'-9"	5'-4"	0'-3 ¹ / ₂ "	
EE	4	50'-11"	53'-3"	2	5	50'-1"	3'-6"	3'-3 ³ / ₄ "	52'-4"	5'-10"	3'-3 ³ / ₄ "	2	5	8'-5"	3'-0"	0'-3 ¹ / ₂ "	10'-9"	5'-4"	0'-3 ¹ / ₂ "	

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SPECIFICATION REFERENCE	<h2>WING DETAILS</h2> <h3>2:1 FILL SLOPE - TYPE II</h3> <p>VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	 ROAD AND BRIDGE STANDARDS	
		REVISION DATE 07/11	SHEET 4 OF 8 1007.12

WING	WF4			WF5						WF6						
	SIZE	LENGTH	SIZE	a			LENGTH			SIZE	a			LENGTH		
				FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY			
A	4	8'-4"	-	-	-	-	-	-	-	4	4'-4"	2'-7"	0'-2 ⁵ / ₈ "	5'-8"	3'-11"	0'-2 ⁵ / ₈ "
B	4	9'-11"	-	-	-	-	-	-	-	4	4'-10"	2'-5"	0'-2 ³ / ₄ "	6'-2"	3'-10"	0'-2 ³ / ₄ "
C	4	11'-0"	-	-	-	-	-	-	-	4	5'-4"	2'-5"	0'-3 ¹ / ₈ "	6'-8"	3'-10"	0'-3 ¹ / ₈ "
D	4	12'-7"	-	-	-	-	-	-	-	4	5'-10"	2'-7"	0'-3 ¹ / ₈ "	7'-2"	3'-11"	0'-3 ¹ / ₈ "
E	4	14'-2"	-	-	-	-	-	-	-	4	6'-4"	2'-5"	0'-3 ¹ / ₄ "	7'-8"	3'-10"	0'-3 ¹ / ₄ "
F	4	15'-9"	-	-	-	-	-	-	-	4	6'-10"	2'-7"	0'-3 ³ / ₈ "	8'-2"	4'-0"	0'-3 ³ / ₈ "
G	4	17'-4"	-	-	-	-	-	-	-	4	7'-4"	2'-5"	0'-3 ³ / ₈ "	8'-8"	3'-10"	0'-3 ³ / ₈ "
H	4	18'-9"	-	-	-	-	-	-	-	4	7'-4"	2'-7"	0'-3 ¹ / ₈ "	8'-8"	3'-11"	0'-3 ¹ / ₈ "
I	4	19'-11"	4	7'-10"	6'-2"	0'-2 ³ / ₈ "	9'-3"	7'-7"	0'-2 ³ / ₈ "	4	7'-10"	2'-7"	0'-3 ¹ / ₄ "	9'-2"	3'-11"	0'-3 ¹ / ₄ "
J	4	21'-6"	4	8'-4"	6'-3"	0'-2 ¹ / ₂ "	9'-9"	7'-8"	0'-2 ¹ / ₂ "	4	8'-4"	2'-5"	0'-3 ¹ / ₄ "	9'-8"	3'-10"	0'-3 ¹ / ₄ "
K	4	23'-1"	4	8'-10"	6'-6"	0'-2 ¹ / ₂ "	10'-3"	7'-11"	0'-2 ¹ / ₂ "	4	8'-10"	2'-7"	0'-3 ³ / ₈ "	10'-2"	4'-0"	0'-3 ³ / ₈ "
L	4	24'-6"	4	8'-10"	6'-6"	0'-2 ³ / ₈ "	10'-3"	7'-10"	0'-2 ³ / ₈ "	4	8'-10"	2'-5"	0'-3 ¹ / ₈ "	10'-2"	3'-10"	0'-3 ¹ / ₈ "
M	4	26'-1"	5	9'-4"	6'-11"	0'-2 ³ / ₈ "	10'-8"	8'-3"	0'-2 ³ / ₈ "	4	9'-4"	2'-7"	0'-3 ¹ / ₈ "	10'-8"	3'-11"	0'-3 ¹ / ₈ "
N	4	27'-8"	5	9'-10"	7'-2"	0'-2 ³ / ₈ "	11'-2"	8'-6"	0'-2 ³ / ₈ "	4	9'-10"	2'-5"	0'-3 ¹ / ₄ "	11'-2"	3'-10"	0'-3 ¹ / ₄ "
O	4	28'-9"	5	10'-4"	7'-7"	0'-2 ¹ / ₂ "	11'-8"	8'-11"	0'-2 ¹ / ₂ "	4	10'-4"	2'-5"	0'-3 ¹ / ₄ "	11'-8"	3'-10"	0'-3 ¹ / ₄ "
P	4	30'-4"	6	10'-10"	7'-10"	0'-2 ¹ / ₂ "	12'-1"	9'-2"	0'-2 ¹ / ₂ "	4	10'-10"	2'-7"	0'-3 ³ / ₈ "	12'-2"	4'-0"	0'-3 ³ / ₈ "
Q	4	31'-9"	6	10'-10"	7'-7"	0'-2 ³ / ₈ "	12'-1"	8'-11"	0'-2 ³ / ₈ "	4	10'-10"	2'-5"	0'-3 ¹ / ₈ "	12'-2"	3'-10"	0'-3 ¹ / ₈ "
R	4	33'-4"	5	9'-6"	6'-10"	0'-2 ³ / ₈ "	10'-10"	8'-2"	0'-2 ³ / ₈ "	4	11'-4"	2'-7"	0'-3 ¹ / ₄ "	12'-8"	3'-11"	0'-3 ¹ / ₄ "
S	4	34'-11"	5	9'-7"	6'-11"	0'-2 ³ / ₈ "	10'-11"	8'-3"	0'-2 ³ / ₈ "	4	11'-10"	2'-5"	0'-3 ¹ / ₄ "	13'-2"	3'-10"	0'-3 ¹ / ₄ "
T	4	36'-4"	5	9'-5"	6'-5"	0'-2 ³ / ₈ "	10'-9"	7'-9"	0'-2 ³ / ₈ "	4	11'-10"	2'-7"	0'-3 ¹ / ₈ "	13'-2"	3'-11"	0'-3 ¹ / ₈ "
U	4	37'-6"	5	10'-0"	6'-6"	0'-2 ³ / ₈ "	11'-4"	7'-10"	0'-2 ³ / ₈ "	4	12'-4"	2'-7"	0'-3 ¹ / ₈ "	13'-8"	3'-11"	0'-3 ¹ / ₈ "
V	4	39'-1"	5	10'-4"	6'-10"	0'-2 ³ / ₈ "	11'-8"	8'-2"	0'-2 ³ / ₈ "	4	12'-10"	2'-5"	0'-3 ¹ / ₄ "	14'-2"	3'-10"	0'-3 ¹ / ₄ "
W	4	40'-8"	5	10'-10"	6'-11"	0'-2 ³ / ₈ "	12'-8"	8'-9"	0'-2 ³ / ₈ "	5	13'-4"	2'-7"	0'-3 ¹ / ₄ "	15'-2"	4'-5"	0'-3 ¹ / ₄ "
X	4	42'-2"	5	11'-6"	8'-0"	0'-2 ³ / ₈ "	13'-10"	10'-4"	0'-2 ³ / ₈ "	5	14'-4"	2'-11"	0'-3 ¹ / ₄ "	16'-8"	5'-3"	0'-3 ¹ / ₄ "
Y	4	43'-11"	5	12'-4"	9'-1"	0'-2 ¹ / ₂ "	14'-8"	11'-5"	0'-2 ¹ / ₂ "	5	15'-4"	3'-1"	0'-3 ³ / ₈ "	17'-8"	5'-5"	0'-3 ³ / ₈ "
Z	4	45'-6"	6	12'-10"	9'-1"	0'-2 ⁵ / ₈ "	15'-1"	11'-5"	0'-2 ⁵ / ₈ "	5	15'-10"	2'-11"	0'-3 ¹ / ₂ "	18'-1"	5'-3"	0'-3 ¹ / ₂ "
AA	4	46'-7"	6	13'-2"	8'-11"	0'-2 ⁵ / ₈ "	15'-5"	11'-2"	0'-2 ⁵ / ₈ "	5	16'-4"	2'-11"	0'-3 ¹ / ₂ "	18'-7"	5'-3"	0'-3 ¹ / ₂ "
BB	4	48'-1"	6	13'-1"	9'-0"	0'-2 ¹ / ₂ "	15'-5"	11'-3"	0'-2 ¹ / ₂ "	5	16'-4"	3'-1"	0'-3 ³ / ₈ "	18'-8"	5'-5"	0'-3 ³ / ₈ "
CC	4	49'-7"	6	13'-4"	8'-9"	0'-2 ¹ / ₂ "	15'-7"	11'-0"	0'-2 ¹ / ₂ "	5	16'-10"	2'-11"	0'-3 ³ / ₈ "	19'-2"	5'-3"	0'-3 ³ / ₈ "
DD	4	51'-4"	6	13'-10"	8'-8"	0'-2 ⁵ / ₈ "	16'-2"	11'-0"	0'-2 ⁵ / ₈ "	5	17'-10"	3'-1"	0'-3 ¹ / ₂ "	20'-1"	5'-5"	0'-3 ¹ / ₂ "
EE	4	52'-11"	7	14'-4"	8'-9"	0'-2 ⁵ / ₈ "	16'-7"	10'-11"	0'-2 ⁵ / ₈ "	5	18'-4"	2'-11"	0'-3 ¹ / ₂ "	20'-7"	5'-3"	0'-3 ¹ / ₂ "

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ROAD AND BRIDGE STANDARDS

SHEET 5 OF 8

REVISION DATE

1007.13

07/11

WING DETAILS

2:1 FILL SLOPE - TYPE II

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

WING	SIZE	WF 7						WF 8		WF 9		WF 10		WF 11			* E _α
		α			LENGTH			SIZE	LENGTH	SIZE	LENGTH	SIZE	α	LENGTH			
		FROM	TO	VARY BY	FROM	TO	VARY BY										
A	-	-	-	-	-	-	-	4	8'-1"	4	4'-2"	4	2'-2"	4	2'-2"	4'-2"	4
B	-	-	-	-	-	-	-	4	9'-7"	4	4'-8"	4	2'-2"	4	2'-2"	4'-2"	4
C	-	-	-	-	-	-	-	4	10'-7"	4	5'-2"	4	2'-2"	4	2'-2"	4'-2"	4
D	-	-	-	-	-	-	-	4	12'-1"	4	5'-8"	4	2'-2"	4	2'-2"	4'-2"	4
E	-	-	-	-	-	-	-	4	13'-7"	4	6'-2"	4	2'-2"	4	2'-2"	4'-2"	4
F	-	-	-	-	-	-	-	4	15'-1"	4	6'-8"	4	2'-2"	4	2'-2"	4'-2"	4
G	-	-	-	-	-	-	-	4	16'-8"	4	7'-2"	4	2'-2"	4	2'-2"	4'-2"	4
H	-	-	-	-	-	-	-	4	18'-2"	4	7'-2"	4	2'-2"	4	2'-2"	4'-2"	4
I	-	-	-	-	-	-	-	4	19'-2"	4	7'-8"	4	2'-2"	4	2'-2"	4'-2"	4
J	-	-	-	-	-	-	-	4	20'-8"	4	8'-1"	4	2'-2"	4	2'-2"	4'-2"	4
K	-	-	-	-	-	-	-	4	22'-2"	4	8'-7"	4	2'-2"	4	2'-2"	4'-2"	4
L	-	-	-	-	-	-	-	4	23'-8"	4	8'-7"	4	2'-2"	4	2'-2"	4'-2"	4
M	-	-	-	-	-	-	-	4	25'-2"	4	9'-1"	4	2'-2"	4	2'-2"	4'-2"	4
N	-	-	-	-	-	-	-	4	26'-8"	4	9'-7"	4	2'-2"	4	2'-2"	4'-2"	4
O	-	-	-	-	-	-	-	4	27'-8"	4	10'-1"	4	2'-2"	4	2'-2"	4'-2"	4
P	-	-	-	-	-	-	-	4	29'-2"	4	10'-7"	4	2'-2"	4	2'-2"	4'-2"	4
Q	-	-	-	-	-	-	-	4	30'-8"	4	10'-7"	4	2'-2"	4	2'-2"	4'-2"	4
R	5	11'-4"	9'-9"	0'-1 ⁵ / ₈ "	12'-8"	11'-0"	0'-1 ⁵ / ₈ "	4	32'-1"	4	11'-1"	4	2'-2"	4	2'-2"	4'-2"	4
S	6	11'-10"	9'-9"	0'-1 ⁵ / ₈ "	13'-1"	11'-1"	0'-1 ⁵ / ₈ "	4	33'-7"	4	11'-7"	4	2'-2"	4	2'-2"	4'-2"	4
T	6	11'-10"	9'-7"	0'-1 ¹ / ₂ "	13'-1"	10'-11"	0'-1 ¹ / ₂ "	4	35'-1"	4	11'-7"	4	2'-2"	4	2'-2"	4'-2"	4
U	6	12'-4"	10'-2"	0'-1 ¹ / ₂ "	13'-7"	11'-5"	0'-1 ¹ / ₂ "	4	36'-1"	4	12'-1"	4	2'-2"	4	2'-2"	4'-2"	4
V	6	12'-10"	10'-6"	0'-1 ⁵ / ₈ "	14'-1"	11'-10"	0'-1 ⁵ / ₈ "	4	37'-7"	4	12'-7"	4	2'-2"	4	2'-2"	4'-2"	4
W	6	13'-4"	11'-0"	0'-1 ⁵ / ₈ "	15'-1"	12'-9"	0'-1 ⁵ / ₈ "	4	39'-1"	4	13'-1"	4	2'-2"	4	2'-2"	4'-2"	4
X	6	14'-4"	11'-9"	0'-1 ⁵ / ₈ "	16'-7"	14'-0"	0'-1 ⁵ / ₈ "	4	40'-7"	4	14'-1"	4	2'-8"	4	2'-2"	4'-2"	4
Y	7	15'-4"	12'-7"	0'-1 ⁵ / ₈ "	17'-7"	14'-10"	0'-1 ⁵ / ₈ "	4	42'-1"	4	15'-1"	4	2'-8"	4	2'-2"	4'-2"	4
Z	7	15'-10"	13'-1"	0'-1 ³ / ₄ "	18'-1"	15'-3"	0'-1 ³ / ₄ "	4	43'-7"	4	15'-7"	4	2'-8"	4	2'-2"	4'-2"	4
AA	7	16'-4"	13'-5"	0'-1 ³ / ₄ "	18'-7"	15'-7"	0'-1 ³ / ₄ "	4	44'-7"	4	16'-2"	4	2'-8"	4	2'-2"	4'-2"	4
BB	7	16'-4"	13'-4"	0'-1 ⁵ / ₈ "	18'-7"	15'-7"	0'-1 ⁵ / ₈ "	4	46'-1"	4	16'-2"	4	2'-8"	4	2'-2"	4'-2"	4
CC	7	16'-10"	13'-6"	0'-1 ⁵ / ₈ "	19'-1"	15'-9"	0'-1 ⁵ / ₈ "	4	47'-7"	4	16'-8"	4	2'-8"	4	2'-2"	4'-2"	4
DD	7	17'-10"	14'-1"	0'-1 ³ / ₄ "	20'-1"	16'-4"	0'-1 ³ / ₄ "	4	49'-1"	4	17'-8"	4	2'-8"	4	2'-2"	4'-2"	4
EE	7	18'-4"	14'-7"	0'-1 ³ / ₄ "	20'-7"	16'-10"	0'-1 ³ / ₄ "	4	50'-7"	4	18'-2"	4	2'-8"	4	2'-2"	4'-2"	4

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SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2: 1 FILL SLOPE - TYPE II</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	ROAD AND BRIDGE STANDARDS	
		REVISION DATE	SHEET 6 OF 8
		07/11	1007.14

WING	STEM BAR SPACINGS												WV1						WV2					
	WV1		WV2		WV3		WV4		WH1		WH2		SIZE	α			LENGTH			SIZE	LENGTH			
	O	P	Q	R	S	T	U	V	W	X	Y	Z		FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY	
A	8	8'-0"	6	7'-6"	-	-	-	-	-	-	1	1'-3"	4	4'-11"	2'-3"	0'-4"	6'-10"	4'-1"	0'-4"	4	4'-11"	2'-5"	0'-5"	
B	10	10'-0"	8	10'-0"	-	-	-	-	1	0'-6"	1	1'-3"	4	5'-5"	2'-1"	0'-4"	7'-4"	3'-11"	0'-4"	4	5'-5"	2'-1"	0'-5"	
C	11	11'-0"	8	10'-0"	-	-	-	-	-	-	2	2'-6"	4	5'-11"	2'-1"	0'-4 1/8"	7'-10"	4'-0"	0'-4 1/8"	4	5'-11"	2'-5"	0'-5 1/4"	
D	12	12'-0"	10	12'-6"	-	-	-	-	-	-	2	2'-6"	4	6'-5"	2'-3"	0'-4 1/8"	8'-4"	4'-2"	0'-4 1/8"	4	6'-5"	2'-1"	0'-5 1/8"	
E	14	14'-0"	11	13'-9"	-	-	-	-	-	-	3	3'-9"	4	6'-11"	2'-1"	0'-4 1/8"	8'-10"	4'-0"	0'-4 1/8"	4	6'-11"	2'-2"	0'-5 1/8"	
F	15	15'-0"	12	15'-0"	-	-	-	-	-	-	3	3'-9"	4	7'-5"	2'-3"	0'-4 1/8"	9'-4"	4'-2"	0'-4 1/8"	4	7'-5"	2'-3"	0'-5 1/8"	
G	17	17'-0"	13	16'-3"	-	-	-	-	1	0'-6"	3	3'-9"	4	7'-11"	2'-1"	0'-4 1/8"	9'-10"	3'-11"	0'-4 1/8"	4	7'-11"	2'-4"	0'-5 1/8"	
H	18	18'-0"	14	17'-6"	-	-	-	-	-	-	4	5'-0"	4	8'-5"	2'-3"	0'-4"	10'-4"	4'-2"	0'-4"	4	8'-5"	2'-5"	0'-5 1/8"	
I	12	12'-0"	15	18'-9"	8	6'-0"	-	-	-	-	4	5'-0"	4	6'-5"	2'-3"	0'-4 1/8"	8'-4"	4'-2"	0'-4 1/8"	4	8'-11"	2'-4"	0'-5 1/4"	
J	12	12'-0"	16	20'-0"	10	7'-6"	-	-	-	-	5	6'-3"	4	6'-5"	2'-3"	0'-4 1/8"	8'-4"	4'-2"	0'-4 1/8"	4	9'-5"	2'-5"	0'-5 1/4"	
K	13	13'-0"	18	22'-6"	11	8'-3"	-	-	-	-	5	6'-3"	4	6'-8"	2'-2"	0'-4 1/8"	8'-7"	4'-1"	0'-4 1/8"	4	9'-11"	2'-1"	0'-5 1/8"	
L	14	14'-0"	19	23'-9"	12	9'-0"	-	-	1	0'-6"	5	6'-3"	4	6'-11"	2'-1"	0'-4 1/8"	8'-10"	4'-0"	0'-4 1/8"	4	10'-5"	2'-2"	0'-5 1/8"	
M	15	15'-0"	20	25'-0"	12	9'-0"	-	-	-	-	6	7'-6"	4	7'-5"	2'-3"	0'-4 1/8"	9'-4"	4'-2"	0'-4 1/8"	4	10'-11"	2'-3"	0'-5 1/8"	
N	16	16'-0"	21	26'-3"	13	9'-9"	-	-	-	-	6	7'-6"	5	7'-8"	2'-2"	0'-4 1/8"	9'-8"	4'-1"	0'-4 1/8"	4	11'-5"	2'-4"	0'-5 1/8"	
O	17	17'-0"	22	27'-6"	13	9'-9"	-	-	-	-	7	8'-9"	5	8'-2"	2'-2"	0'-4 1/8"	10'-1"	4'-1"	0'-4 1/8"	4	11'-11"	2'-3"	0'-5 1/4"	
P	18	18'-0"	23	28'-9"	14	10'-6"	-	-	-	-	7	8'-9"	5	8'-5"	2'-1"	0'-4 1/8"	10'-4"	4'-0"	0'-4 1/8"	4	12'-5"	2'-4"	0'-5 1/4"	
Q	18	18'-0"	24	30'-0"	16	12'-0"	-	-	1	0'-6"	7	8'-9"	5	8'-4"	2'-1"	0'-4 1/8"	10'-4"	4'-0"	0'-4 1/8"	4	12'-11"	2'-5"	0'-5 1/4"	
R	15	15'-0"	26	32'-6"	13	9'-9"	12	6'-0"	-	-	8	10'-0"	4	7'-4"	2'-1"	0'-4 1/8"	9'-2"	4'-0"	0'-4 1/8"	4	13'-5"	2'-1"	0'-5 1/8"	
S	15	15'-0"	27	33'-9"	13	9'-9"	15	7'-6"	-	-	8	10'-0"	4	7'-4"	2'-1"	0'-4 1/8"	9'-2"	4'-0"	0'-4 1/8"	4	13'-11"	2'-2"	0'-5 1/8"	
T	14	14'-0"	28	35'-0"	15	11'-3"	17	8'-6"	-	-	9	11'-3"	4	6'-11"	2'-1"	0'-4 1/8"	8'-10"	4'-0"	0'-4 1/8"	4	14'-5"	2'-3"	0'-5 1/8"	
U	14	14'-0"	29	36'-3"	17	12'-9"	16	8'-0"	-	-	9	11'-3"	4	7'-0"	2'-1"	0'-4 1/8"	8'-11"	4'-0"	0'-4 1/8"	4	14'-11"	2'-2"	0'-5 1/4"	
V	15	15'-0"	30	37'-6"	17	12'-9"	17	8'-6"	1	0'-6"	9	11'-3"	4	7'-4"	2'-1"	0'-4 1/8"	9'-3"	4'-0"	0'-4 1/8"	4	15'-5"	2'-3"	0'-5 1/4"	
W	15	15'-0"	31	38'-9"	19	14'-3"	17	8'-6"	-	-	10	12'-6"	4	7'-7"	2'-4"	0'-4 1/8"	9'-6"	4'-3"	0'-4 1/8"	4	16'-2"	2'-7"	0'-5 1/4"	
X	17	17'-0"	32	40'-0"	17	12'-9"	19	9'-6"	-	-	10	12'-6"	4	8'-6"	2'-7"	0'-4 1/8"	10'-5"	4'-6"	0'-4 1/8"	4	16'-11"	2'-11"	0'-5 1/4"	
Y	20	20'-0"	34	42'-6"	15	11'-3"	19	9'-6"	-	-	11	13'-9"	4	9'-7"	2'-7"	0'-4 1/8"	11'-5"	4'-6"	0'-4 1/8"	4	17'-5"	2'-7"	0'-5 1/8"	
Z	20	20'-0"	35	43'-9"	17	12'-9"	19	9'-6"	-	-	11	13'-9"	4	9'-7"	2'-7"	0'-4 1/8"	11'-5"	4'-6"	0'-4 1/8"	4	17'-11"	2'-8"	0'-5 1/8"	
AA	19	19'-0"	36	45'-0"	19	14'-3"	20	10'-0"	1	0'-6"	11	13'-9"	4	9'-3"	2'-7"	0'-4 1/8"	11'-2"	4'-6"	0'-4 1/8"	4	18'-5"	2'-7"	0'-5 1/4"	
BB	20	20'-0"	37	46'-3"	19	14'-3"	21	10'-6"	-	-	12	15'-0"	4	9'-7"	2'-7"	0'-4 1/8"	11'-6"	4'-6"	0'-4 1/8"	4	18'-11"	2'-8"	0'-5 1/4"	
CC	19	19'-0"	38	47'-6"	21	15'-9"	23	11'-6"	-	-	12	15'-0"	4	9'-3"	2'-7"	0'-4 1/8"	11'-2"	4'-6"	0'-4 1/8"	4	19'-5"	2'-9"	0'-5 1/4"	
DD	18	18'-0"	39	48'-9"	23	17'-3"	25	12'-6"	-	-	13	16'-3"	4	8'-10"	2'-7"	0'-4 1/8"	10'-9"	4'-6"	0'-4 1/8"	4	19'-11"	2'-10"	0'-5 1/4"	
EE	18	18'-0"	40	50'-0"	25	18'-9"	25	12'-6"	-	-	13	16'-3"	4	8'-10"	2'-7"	0'-4 1/8"	10'-9"	4'-6"	0'-4 1/8"	4	20'-5"	2'-11"	0'-5 1/4"	

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VDOT	
ROAD AND BRIDGE STANDARDS	
SHEET 7 OF 8	REVISION DATE
1007.15	07/11

<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2:1 FILL SLOPE - TYPE II</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>

SPECIFICATION REFERENCE

WING	SIZE	WV3						WV4						WH1		WH2				WH3				
		g			LENGTH			SIZE	g			LENGTH			SIZE	LENGTH	• Ea	LENGTH			SIZE	LENGTH		
		FROM	TO	VARY BY	FROM	TO	VARY BY		FROM	TO	VARY BY	FROM	TO	VARY BY				FROM	TO	VARY BY			• EA	
A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	8'-6"	2	4	6'-6"	2'-10"	3'-7 $\frac{1}{2}$ "	2	4	9'-0"
B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	10'-0"	2	4	6'-7"	2'-10"	3'-8 $\frac{3}{8}$ "	2	4	10'-7"
C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	11'-0"	2	4	9'-10"	2'-9"	3'-6 $\frac{3}{8}$ "	2	4	11'-7"
D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	12'-6"	2	4	9'-10"	2'-9"	3'-6 $\frac{1}{4}$ "	2	4	13'-3"
E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	14'-0"	2	4	13'-6"	2'-9"	3'-6 $\frac{3}{4}$ "	2	4	14'-10"
F	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	15'-6"	2	4	13'-7"	2'-10"	3'-7"	2	4	16'-5"
G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	17'-0"	2	4	13'-7"	2'-10"	3'-7"	2	4	18'-0"
H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	18'-6"	2	4	17'-3"	2'-10"	3'-7 $\frac{1}{4}$ "	2	4	19'-6"
I	4	8'-11"	6'-10"	0'-3 $\frac{1}{8}$ "	10'-10"	8'-8"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	19'-6"	2	4	16'-11"	2'-9"	3'-6 $\frac{3}{8}$ "	2	4	20'-8"
J	4	9'-5"	6'-9"	0'-3 $\frac{1}{8}$ "	11'-4"	8'-8"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	21'-0"	2	4	20'-6"	2'-9"	3'-6 $\frac{1}{2}$ "	2	4	22'-3"
K	5	9'-11"	7'-0"	0'-3 $\frac{1}{8}$ "	11'-10"	9'-0"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	22'-6"	2	4	20'-6"	2'-9"	3'-6 $\frac{5}{8}$ "	2	4	23'-9"
L	5	10'-5"	7'-3"	0'-3 $\frac{1}{8}$ "	12'-4"	9'-3"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	24'-0"	2	4	20'-8"	2'-9"	3'-6 $\frac{1}{8}$ "	2	4	25'-5"
M	6	10'-11"	7'-10"	0'-3"	12'-11"	9'-10"	0'-3"	-	-	-	-	-	-	-	4	25'-6"	2	4	24'-3"	2'-9"	3'-6 $\frac{7}{8}$ "	2	4	27'-0"
N	6	11'-5"	8'-0"	0'-3"	13'-5"	10'-1"	0'-3"	-	-	-	-	-	-	-	4	27'-0"	2	4	24'-3"	2'-0"	3'-7"	2	4	28'-6"
O	6	11'-11"	8'-6"	0'-3 $\frac{1}{8}$ "	13'-11"	10'-6"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	28'-0"	2	4	27'-6"	2'-9"	3'-6 $\frac{3}{8}$ "	2	4	29'-8"
P	6	12'-5"	8'-9"	0'-3 $\frac{1}{8}$ "	14'-5"	10'-9"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	29'-6"	2	4	27'-6"	2'-9"	3'-6 $\frac{1}{2}$ "	2	4	31'-3"
Q	7	12'-11"	8'-9"	0'-3 $\frac{1}{8}$ "	15'-0"	10'-10"	0'-3 $\frac{1}{8}$ "	-	-	-	-	-	-	-	4	31'-0"	2	4	27'-8"	2'-9"	3'-6 $\frac{5}{8}$ "	2	4	32'-10"
R	6	11'-1"	7'-8"	0'-3 $\frac{1}{8}$ "	13'-1"	9'-8"	0'-3 $\frac{1}{8}$ "	6	13'-5"	11'-4"	0'-2"	15'-5"	13'-4"	0'-2"	4	32'-6"	2	4	31'-3"	2'-10"	3'-6 $\frac{5}{8}$ "	2	4	34'-4"
S	6	11'-0"	7'-8"	0'-3 $\frac{1}{8}$ "	13'-1"	9'-8"	0'-3 $\frac{1}{8}$ "	6	13'-11"	11'-4"	0'-2"	15'-11"	13'-4"	0'-2"	4	34'-0"	2	4	31'-3"	2'-10"	3'-6 $\frac{3}{4}$ "	2	4	36'-0"
T	6	11'-2"	7'-3"	0'-3 $\frac{1}{8}$ "	13'-3"	9'-4"	0'-3 $\frac{1}{8}$ "	6	14'-5"	11'-6"	0'-2"	16'-5"	13'-6"	0'-2"	4	35'-6"	2	4	35'-0"	2'-10"	3'-6 $\frac{7}{8}$ "	2	4	37'-7"
U	6	11'-10"	7'-4"	0'-3 $\frac{1}{8}$ "	13'-10"	9'-5"	0'-3 $\frac{1}{8}$ "	7	14'-11"	12'-1"	0'-2"	17'-0"	14'-3"	0'-2"	4	36'-6"	2	4	34'-7"	2'-9"	3'-6 $\frac{3}{8}$ "	2	4	38'-9"
V	6	12'-2"	7'-8"	0'-3 $\frac{1}{8}$ "	14'-2"	9'-9"	0'-3 $\frac{1}{8}$ "	7	15'-5"	12'-5"	0'-2"	17'-6"	14'-7"	0'-2"	4	38'-0"	2	4	34'-7"	2'-9"	3'-6 $\frac{1}{2}$ "	2	4	40'-4"
W	6	12'-11"	7'-11"	0'-3 $\frac{1}{8}$ "	14'-11"	9'-11"	0'-3 $\frac{1}{8}$ "	7	16'-2"	13'-2"	0'-2"	18'-3"	15'-4"	0'-2"	4	39'-6"	2	4	38'-3"	2'-10"	3'-6 $\frac{1}{2}$ "	2	4	41'-11"
X	6	13'-4"	8'-10"	0'-3 $\frac{1}{8}$ "	15'-4"	10'-11"	0'-3 $\frac{1}{8}$ "	7	16'-11"	13'-7"	0'-2"	19'-0"	15'-9"	0'-2"	4	41'-0"	2	4	38'-4"	2'-9"	3'-6 $\frac{5}{8}$ "	2	4	43'-6"
Y	7	13'-10"	9'-11"	0'-3 $\frac{1}{8}$ "	15'-11"	12'-0"	0'-3 $\frac{1}{8}$ "	7	17'-5"	14'-1"	0'-2"	19'-6"	16'-3"	0'-2"	4	42'-6"	2	4	42'-0"	2'-9"	3'-6 $\frac{3}{4}$ "	2	4	45'-0"
Z	7	14'-4"	9'-11"	0'-3 $\frac{1}{8}$ "	16'-6"	12'-0"	0'-3 $\frac{1}{8}$ "	7	17'-11"	14'-7"	0'-2"	20'-0"	16'-9"	0'-2"	4	44'-0"	2	4	42'-1"	2'-9"	3'-6 $\frac{7}{8}$ "	2	4	46'-7"
AA	7	14'-8"	9'-7"	0'-3 $\frac{1}{8}$ "	16'-9"	11'-9"	0'-3 $\frac{1}{8}$ "	7	18'-5"	14'-11"	0'-2"	20'-6"	17'-0"	0'-2"	4	45'-0"	2	4	41'-7"	2'-9"	3'-6 $\frac{3}{8}$ "	2	4	47'-9"
BB	7	15'-0"	9'-11"	0'-3 $\frac{1}{8}$ "	17'-1"	12'-1"	0'-3 $\frac{1}{8}$ "	8	18'-11"	15'-3"	0'-2"	21'-1"	17'-5"	0'-2"	4	46'-6"	2	4	45'-3"	2'-9"	3'-6 $\frac{1}{2}$ "	2	4	49'-4"
CC	7	15'-1"	9'-7"	0'-3 $\frac{1}{8}$ "	17'-3"	11'-8"	0'-3 $\frac{1}{8}$ "	8	19'-5"	15'-5"	0'-2"	21'-7"	17'-7"	0'-2"	4	48'-0"	2	4	45'-4"	2'-10"	3'-6 $\frac{1}{2}$ "	2	4	50'-11"
DD	7	15'-3"	9'-3"	0'-3 $\frac{1}{8}$ "	17'-5"	11'-4"	0'-3 $\frac{1}{8}$ "	8	19'-11"	15'-6"	0'-2"	22'-1"	17'-9"	0'-2"	4	49'-6"	2	4	49'-0"	2'-9"	3'-6 $\frac{5}{8}$ "	2	4	52'-6"
EE	7	15'-9"	9'-3"	0'-3 $\frac{1}{8}$ "	17'-11"	11'-4"	0'-3 $\frac{1}{8}$ "	9	20'-5"	16'-0"	0'-2"	22'-10"	18'-6"	0'-2"	4	51'-0"	2	4	49'-1"	2'-9"	3'-6 $\frac{3}{4}$ "	2	4	54'-1"

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE

SPECIFICATION REFERENCE	<h2 style="margin: 0;">WING DETAILS</h2> <h3 style="margin: 0;">2: 1 FILL SLOPE - TYPE II</h3> <p style="margin: 0;">VIRGINIA DEPARTMENT OF TRANSPORTATION</p>	<p style="margin: 0;">ROAD AND BRIDGE STANDARDS</p>	REVISION DATE	SHEET 8 OF 8
			07/11	1007.16

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ROAD AND BRIDGE STANDARDS

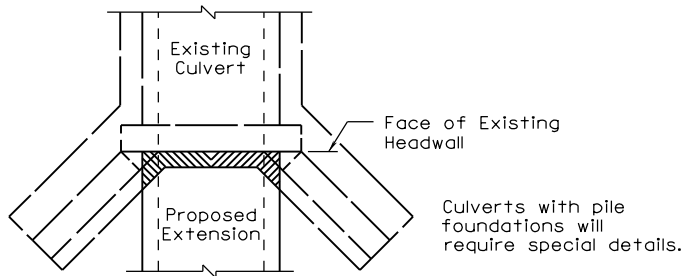
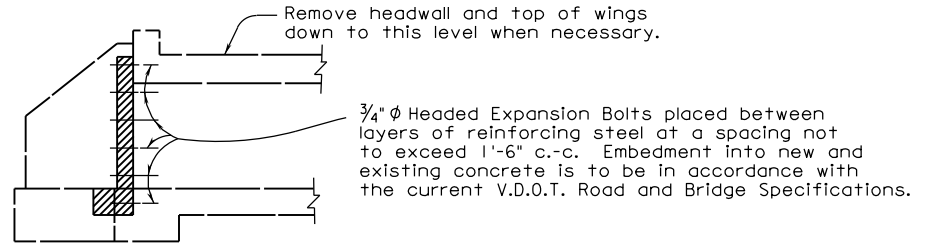
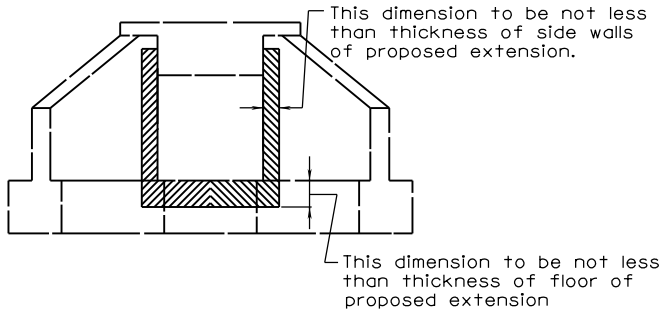
SHEET 1 OF 1

REVISION DATE

07.11

VIRGINIA DEPARTMENT OF TRANSPORTATION

In case of skewed culverts, wingwalls conflicting with barrel of proposed extension are to be removed.



Notes:

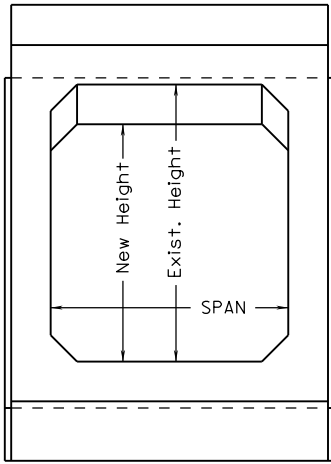
Shaded portion indicates existing concrete to be removed, so that all portions of proposed extension will begin in a vertical plane at face of existing headwall. Details of proposed extension including headwall for same can be obtained from box culvert standard. Unit price bid for concrete and reinforcement shall include cost of removal and disposal of old concrete and the furnishing and placing of dowels and expansion bolts required.

SPECIFICATION REFERENCE

DETAILS FOR WIDENING EXISTING BOX CULVERTS
MODIFICATIONS TO EXISTING BOX
 VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS	
REVISION DATE	SHEET 1 OF 4
07/11	1008.01

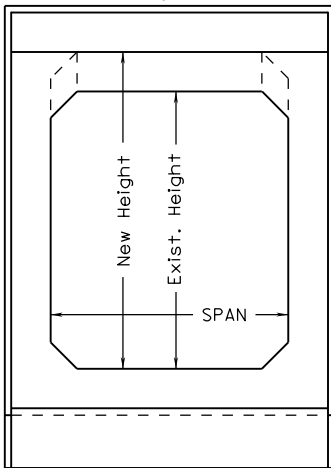
A



A

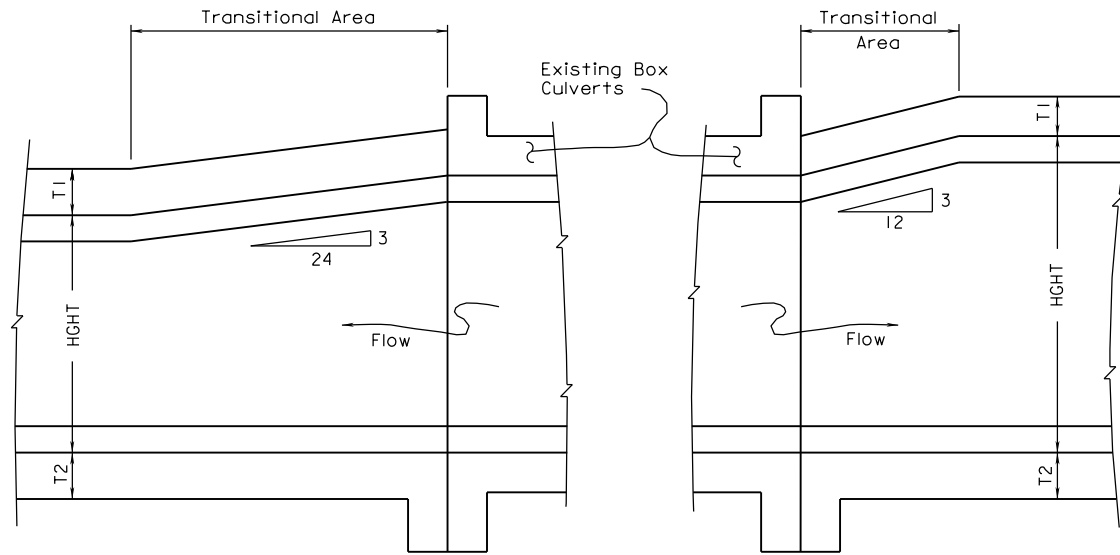
SECTION THRU CULVERT

B



B

SECTION THRU CULVERT



SECTION A-A

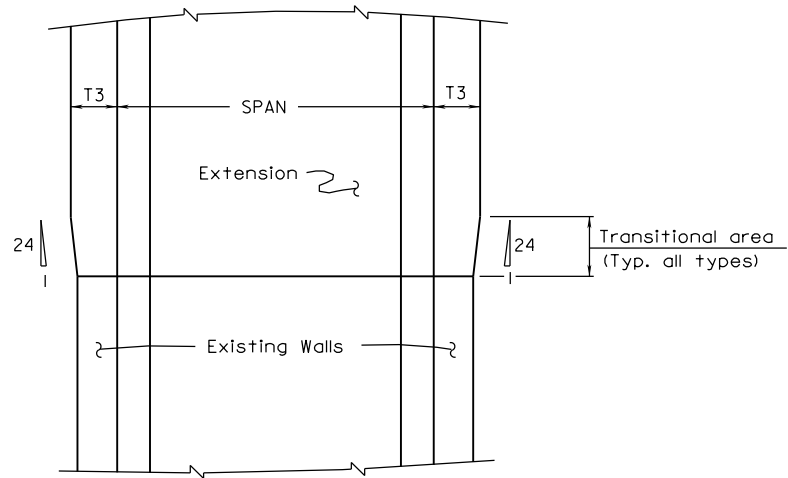
SECTION B-B

Notes:

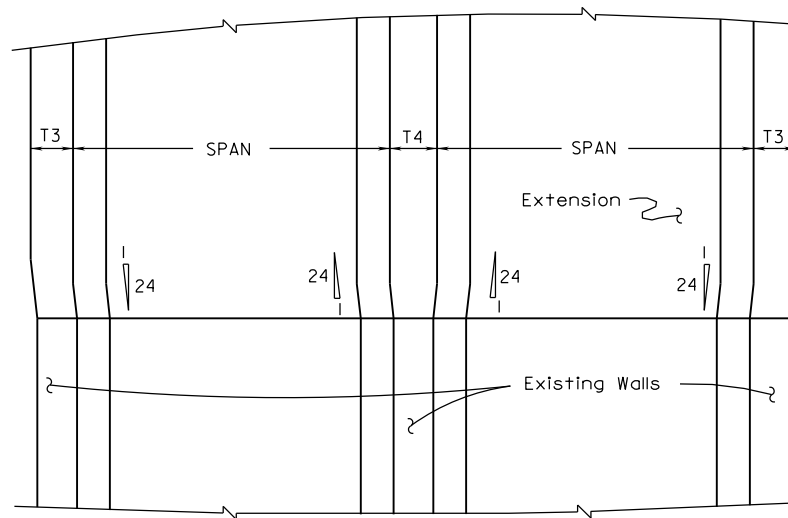
Adjustments in quantities will be required when a change in height exists as shown in Sections A & B. Quantities of concrete and reinforcing steel shall be increased or decreased accordingly. For cases where only wall thickness changes, there shall be no quantity adjustments.

For SPAN, HIGHT, & T dimensions, refer to appropriate Box Culvert Standard. This standard is to be used only when a change in height or wall thickness occurs. It does not apply to changes in SPAN.

For SPAN, HGHT, & T dimensions, refer to appropriate Box Culvert Standard. This standard is to be used only when a change in height or wall thickness occurs. It does not apply to changes in SPAN.



SINGLE BOX CULVERT



DOUBLE BOX CULVERT

SPECIFICATION REFERENCE

DETAILS FOR WIDENING EXISTING BOX CULVERTS
WALL TRANSITIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT

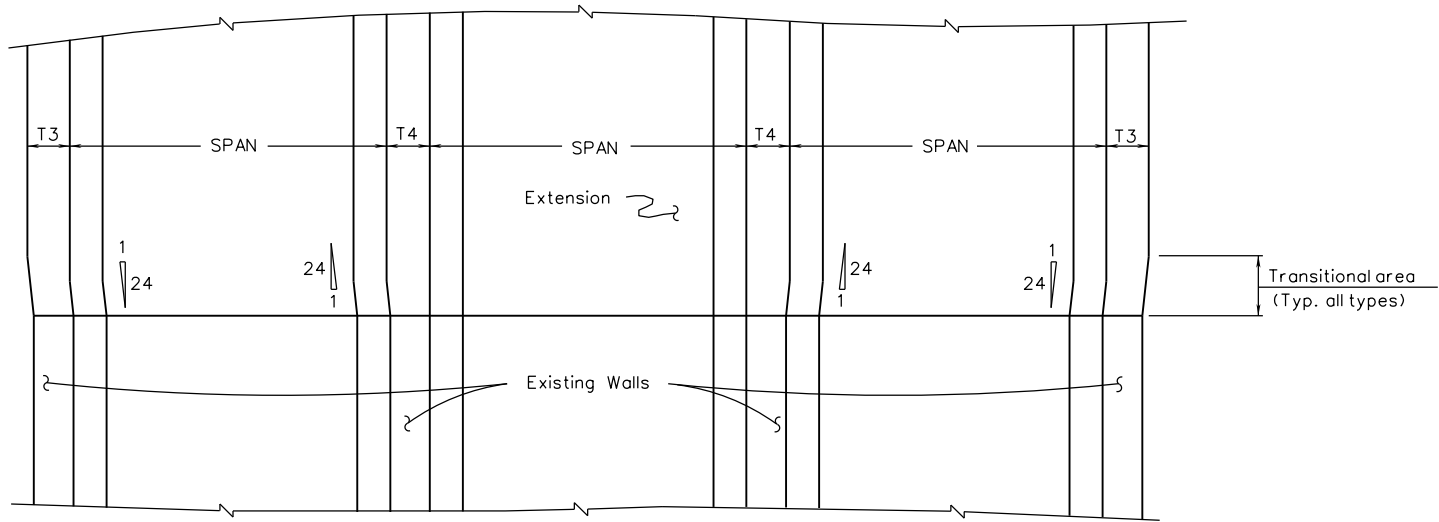
ROAD AND BRIDGE STANDARDS

REVISION DATE

07/11

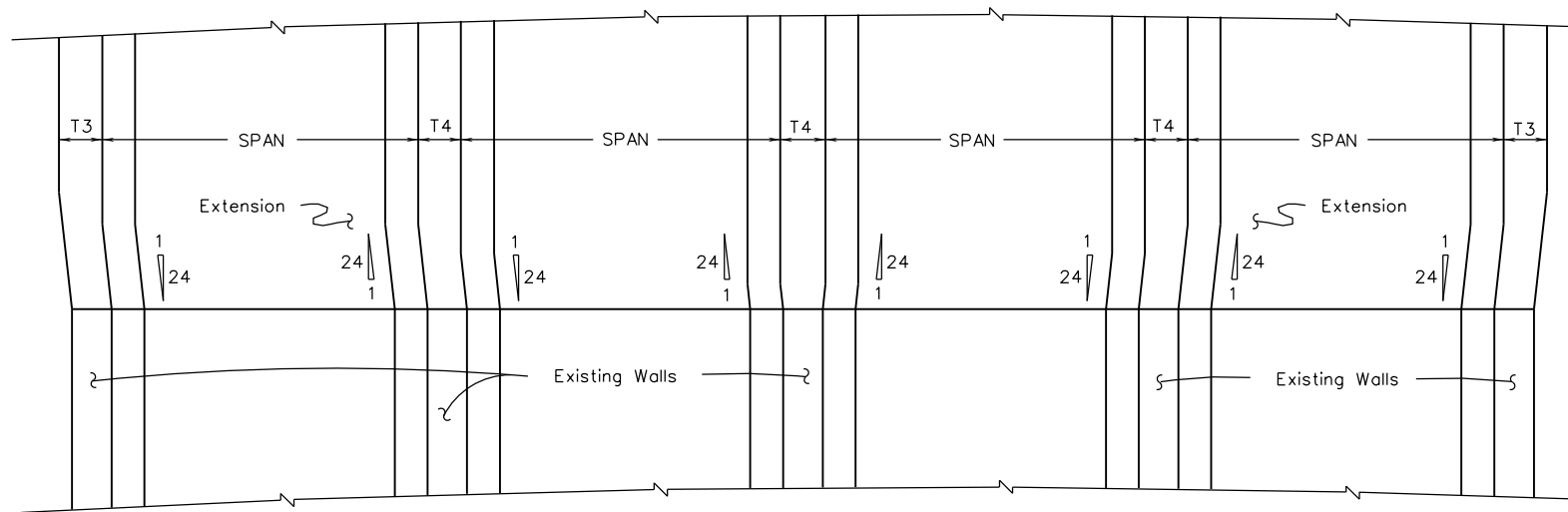
SHEET 3 OF 4

1008.03



TRIPLE BOX CULVERT

For SPAN, HGHT, & T dimensions, refer to appropriate Box Culvert Standard. This standard is to be used only when a change in height or wall thickness occurs. It does not apply to changes in SPAN.



QUADRUPLE BOX CULVERT