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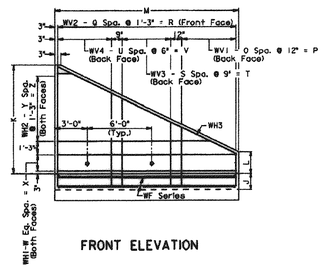
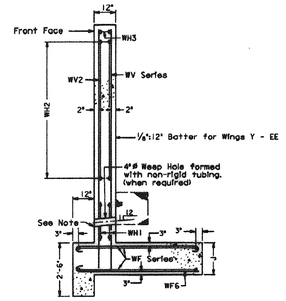
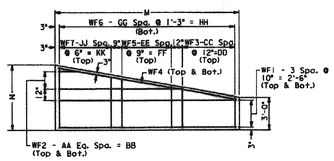


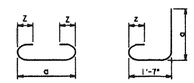
FRONT ELEVATION



END VIEW



FOOTING PLAN



WF3, WF5, WF7

WV1, WV3, WV4

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 1/4"

TABLE C

Bar Size	Splice Length
#4	1'- 4"
#5	1'- 8"
#6	1'-11"
#7	2'- 4"
#8	3'- 1"
#9	3'-11"

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

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GENERAL NOTE

Specifications:

Construction - Va. Department of Transportation Road and Bridge Specifications, 1991.
Design - AASHTO Standard Specifications for Highway Bridges, 1983, including Interim Specifications, 1984, 1985 and VDOT Modifications, using Load Factor Design.

All concrete shall be Class A4.

Deformed reinforcing bars shall conform to ASTM A615, Grade 60. All reinforcing bar dimensions on the detailed drawing 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 centers of main reinforcing bars shall be 2" from the face of the concrete unless otherwise shown.

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

When concrete protective coating is required, all steel shall be epoxy-coated.

Bearing capacity of foundations shall be 1.5 Tons/Sq. Ft. minimum for wings A - X and 2 Tons/Sq. Ft. minimum for wings Y - EE.

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

Four Type I Wings are to be used for straight crossings and skews up to 20°. Two Type I & 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	Quantity (One Wing) Concrete Cu. Yd.	Reinforcing Steel Lbs.
A	2.334	146.814
B	2.741	179.226
C	3.208	202.300
D	3.658	227.238
E	4.174	268.139
F	4.665	294.699
G	5.412	348.564
H	6.153	378.666
I	6.798	431.368
J	7.621	479.805
K	8.567	531.895
L	9.236	601.618
M	10.275	652.010
N	10.623	706.389
O	11.644	765.083
P	12.804	868.664
Q	13.615	938.923
R	14.852	1247.994
S	16.063	1193.231
T	17.077	1263.468
U	18.343	1566.661
V	19.708	2817.306
W	21.169	1838.465
X	24.710	2352.406
Y	29.398	2856.703
Z	31.458	2680.408
AA	33.355	3557.475
BB	36.175	3205.508
CC	38.270	3362.599
DD	45.675	4925.833
EE	48.208	5122.544

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STRUCTURE AND BRIDGE DIVISION

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

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WING	DIMENSIONS J	K	L	M	N	BAR SPACINGS WV1 O	P	WV2 Q	R	WV3 S	T	WV4 U	V	WH1 W	X	WH2 Y	Z	WF2 AA	BB	WF3 CC	DD	WF5 EE	FF	WF6 GG	HH	WF7 JJ	KK	NO. WEEP HOLES
A	1'- 6"	6'- 0"	1'- 6"	7'- 0"	4'- 0"	6	6'- 0"	5	6'- 3"	--	-----	--	-----	--	-----	1	1'- 3"	--	-----	6	6'- 0"	--	-----	5	6'- 3"	--	-----	--
B	1'- 6"	4'- 6"	1'- 6"	8'- 0"	4'- 0"	7	7'- 0"	6	7'- 6"	--	-----	--	-----	1	0'- 6"	1	1'- 3"	--	-----	7	7'- 0"	--	-----	6	7'- 6"	--	-----	--
C	1'- 6"	5'- 0"	1'- 9"	9'- 0"	4'- 0"	8	8'- 0"	6	7'- 6"	--	-----	--	-----	1	1'- 0"	1	1'- 3"	--	-----	8	8'- 0"	--	-----	6	7'- 6"	--	-----	--
D	1'- 6"	5'- 6"	1'- 9"	10'- 0"	4'- 0"	9	9'- 0"	7	8'- 9"	--	-----	--	-----	--	-----	2	2'- 6"	--	-----	9	9'- 0"	--	-----	7	8'- 9"	--	-----	--
E	1'- 6"	6'- 0"	2'- 0"	11'- 0"	4'- 0"	10	10'- 0"	8	10'- 0"	--	-----	--	-----	1	0'- 9"	2	2'- 6"	--	-----	10	10'- 0"	--	-----	8	10'- 0"	--	-----	--
F	1'- 6"	6'- 6"	2'- 0"	12'- 0"	4'- 0"	11	11'- 0"	9	11'- 3"	--	-----	--	-----	1	1'- 3"	2	2'- 6"	--	-----	11	11'- 0"	--	-----	9	11'- 3"	--	-----	--
G	1'- 6"	7'- 0"	2'- 3"	13'- 0"	4'- 6"	12	12'- 0"	10	12'- 6"	--	-----	--	-----	2	1'- 9"	2	2'- 6"	--	-----	12	12'- 0"	--	-----	10	12'- 6"	--	-----	--
H	1'- 6"	7'- 6"	2'- 3"	14'- 0"	5'- 0"	13	13'- 0"	10	12'- 6"	--	-----	--	-----	1	1'- 0"	3	3'- 9"	--	-----	13	13'- 0"	--	-----	10	12'- 6"	--	-----	--
I	1'- 6"	8'- 0"	2'- 6"	15'- 0"	5'- 0"	14	14'- 0"	11	13'- 9"	--	-----	--	-----	2	1'- 6"	3	3'- 9"	--	-----	14	14'- 0"	--	-----	11	13'- 9"	--	-----	--
J	1'- 6"	8'- 6"	2'- 6"	16'- 0"	5'- 6"	15	15'- 0"	12	15'- 0"	--	-----	--	-----	2	2'- 0"	3	3'- 9"	1	0'- 9"	15	15'- 0"	--	-----	12	15'- 0"	--	-----	--
K	1'- 6"	9'- 0"	2'- 9"	17'- 0"	6'- 0"	16	16'- 0"	13	16'- 3"	--	-----	--	-----	1	1'- 3"	4	5'- 0"	2	1'- 3"	16	16'- 0"	--	-----	13	16'- 3"	--	-----	--
L	1'- 6"	9'- 6"	2'- 9"	18'- 0"	6'- 0"	12	12'- 0"	14	17'- 6"	6	4'- 6"	--	-----	2	1'- 9"	4	5'- 0"	2	1'- 3"	17	17'- 0"	--	-----	14	17'- 6"	--	-----	--
M	1'- 6"	10'- 0"	3'- 0"	19'- 0"	6'- 6"	13	13'- 0"	14	17'- 6"	6	4'- 6"	--	-----	2	2'- 3"	4	5'- 0"	2	1'- 9"	13	13'- 0"	6	4'- 6"	14	17'- 6"	--	-----	--
N	1'- 6"	10'- 6"	3'- 6"	19'- 0"	6'- 6"	10	10'- 0"	14	17'- 6"	6	4'- 6"	4	2'- 0"	3	2'- 9"	4	5'- 0"	2	1'- 9"	13	13'- 0"	6	4'- 6"	14	17'- 6"	--	-----	--
O	1'- 6"	11'- 0"	3'- 6"	20'- 0"	7'- 0"	11	11'- 0"	15	18'- 9"	6	4'- 6"	4	2'- 0"	2	2'- 0"	5	6'- 3"	3	2'- 3"	14	14'- 0"	6	4'- 6"	15	18'- 9"	--	-----	1
P	1'- 6"	11'- 6"	3'- 9"	21'- 0"	7'- 6"	8	8'- 0"	16	20'- 0"	9	6'- 9"	8	4'- 0"	2	2'- 6"	5	6'- 3"	3	2'- 9"	9	9'- 0"	5	3'- 9"	16	20'- 0"	12	6'- 0"	1
Q	1'- 6"	12'- 0"	3'- 9"	22'- 0"	7'- 6"	9	9'- 0"	17	21'- 3"	9	6'- 9"	8	4'- 0"	3	3'- 0"	5	6'- 3"	3	2'- 9"	10	10'- 0"	5	3'- 9"	17	21'- 3"	12	6'- 0"	1
R	1'- 6"	12'- 6"	4'- 0"	23'- 0"	8'- 0"	10	10'- 0"	18	22'- 6"	9	6'- 9"	8	4'- 0"	3	3'- 6"	5	6'- 3"	3	3'- 3"	11	11'- 0"	5	3'- 9"	18	22'- 6"	12	6'- 0"	1
S	1'- 6"	13'- 0"	4'- 0"	24'- 0"	8'- 6"	11	11'- 0"	18	22'- 6"	9	6'- 9"	8	4'- 0"	3	2'- 9"	6	7'- 6"	4	3'- 9"	12	12'- 0"	5	3'- 9"	18	22'- 6"	12	6'- 0"	1
T	1'- 6"	13'- 6"	4'- 3"	25'- 0"	8'- 6"	12	12'- 0"	19	23'- 9"	9	6'- 9"	8	4'- 0"	3	3'- 3"	6	7'- 6"	4	3'- 9"	9	9'- 0"	7	5'- 3"	19	23'- 9"	17	8'- 6"	2
U	1'- 6"	14'- 0"	4'- 3"	26'- 0"	9'- 0"	12	12'- 0"	20	25'- 0"	9	6'- 9"	10	5'- 0"	3	3'- 9"	6	7'- 6"	5	4'- 3"	11	11'- 0"	11	8'- 3"	20	25'- 0"	9	4'- 6"	2
V	1'- 6"	14'- 6"	4'- 6"	27'- 0"	9'- 6"	10	10'- 0"	21	26'- 3"	13	9'- 9"	10	5'- 0"	3	3'- 0"	7	8'- 9"	5	4'- 9"	11	11'- 0"	11	8'- 3"	21	26'- 3"	11	5'- 6"	2
W	1'- 6"	15'- 0"	4'- 6"	28'- 0"	10'- 0"	11	11'- 0"	22	27'- 6"	13	9'- 9"	10	5'- 0"	3	3'- 6"	7	8'- 9"	6	5'- 3"	11	11'- 0"	11	8'- 3"	22	27'- 6"	13	6'- 6"	2
X	1'- 9"	15'- 6"	4'- 9"	29'- 0"	11'- 0"	11	11'- 0"	22	27'- 6"	13	9'- 9"	12	6'- 0"	4	4'- 0"	7	8'- 9"	7	6'- 3"	9	9'- 0"	15	11'- 3"	22	27'- 6"	13	6'- 6"	2
Y	2'- 0"	16'- 0"	4'- 9"	30'- 0"	12'- 0"	10	10'- 0"	23	28'- 9"	17	12'- 9"	10	5'- 0"	3	3'- 3"	8	10'- 0"	8	7'- 3"	9	9'- 0"	15	11'- 3"	23	28'- 9"	15	7'- 6"	3
Z	2'- 0"	16'- 6"	5'- 0"	31'- 0"	12'- 6"	10	10'- 0"	24	30'- 0"	17	12'- 9"	12	6'- 0"	3	3'- 9"	8	10'- 0"	8	7'- 9"	9	9'- 0"	15	11'- 3"	24	30'- 0"	17	8'- 6"	3
AA	2'- 0"	17'- 0"	5'- 0"	32'- 0"	13'- 0"	11	11'- 0"	25	31'- 3"	17	12'- 9"	12	6'- 0"	4	4'- 3"	8	10'- 0"	9	8'- 3"	10	10'- 0"	15	11'- 3"	25	31'- 3"	17	8'- 6"	3
BB	2'- 0"	17'- 6"	5'- 3"	33'- 0"	14'- 0"	12	12'- 0"	26	32'- 6"	17	12'- 9"	12	6'- 0"	4	4'- 9"	8	10'- 0"	10	9'- 3"	11	11'- 0"	15	11'- 3"	26	32'- 6"	17	8'- 6"	3
CC	2'- 0"	18'- 0"	5'- 3"	34'- 0"	14'- 6"	13	13'- 0"	26	32'- 6"	17	12'- 9"	12	6'- 0"	4	4'- 0"	9	11'- 3"	10	9'- 9"	12	12'- 0"	15	11'- 3"	26	32'- 6"	17	8'- 6"	3
DD	2'- 6"	18'- 6"	5'- 6"	35'- 0"	15'- 0"	12	12'- 0"	27	33'- 9"	17	12'- 9"	16	8'- 0"	4	4'- 6"	9	11'- 3"	11	10'- 3"	10	10'- 0"	19	14'- 3"	27	33'- 9"	17	8'- 6"	4
EE	2'- 6"	19'- 0"	5'- 6"	36'- 0"	15'- 6"	12	12'- 0"	28	35'- 0"	17	12'- 9"	18	9'- 0"	4	5'- 0"	9	11'- 3"	11	10'- 9"	11	11'- 0"	19	14'- 3"	28	35'- 0"	17	8'- 6"	4

Sheet 3 of 7

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

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WING	WF1 SIZE	LENGTH	WF2 SIZE	LENGTH From	To	Vary By	# Ea	WF3 SIZE	a LENGTH From	To	Vary By	LENGTH From	To	Vary By	WF4 SIZE	LENGTH
A	4	6'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 7½"	0'- 1¾"	4'- 6"	3'- 7½"	0'- 1¾"	4	6'- 7"
B	4	7'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 7½"	0'- 1½"	4'- 6"	3'- 7½"	0'- 1½"	4	7'- 7"
C	4	8'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 7"	0'- 1⅜"	4'- 6"	3'- 7"	0'- 1⅜"	4	8'- 7"
D	4	9'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 6¾"	0'- 1¼"	4'- 6"	3'- 6¾"	0'- 1¼"	4	9'- 7"
E	4	10'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 6¾"	0'- 1½"	4'- 6"	3'- 6¾"	0'- 1½"	4	10'- 7"
F	4	11'- 6"	--	-----	-----	-----	--	4	3'- 6"	2'- 7"	0'- 1"	4'- 6"	3'- 7"	0'- 1"	4	11'- 6"
G	4	12'- 6"	4	4'- 1"	-----	-----	2	4	4'- 0"	2'- 7½"	0'- 1⅜"	5'- 0"	3'- 7½"	0'- 1⅜"	4	12'- 7"
H	4	13'- 6"	4	6'- 9"	-----	-----	2	4	4'- 8"	2'- 7¼"	0'- 1¾"	5'- 6"	3'- 7¼"	0'- 1¾"	4	13'- 8"
I	4	14'- 6"	4	7'- 3"	-----	-----	2	4	4'- 6"	2'- 7¼"	0'- 1⅝"	5'- 6"	3'- 7¼"	0'- 1⅝"	4	14'- 8"
J	4	15'- 6"	4	9'- 4"	4'- 6⅝"	4'- 2⅝"	2	4	4'-11"	2'- 6¾"	0'- 1⅞"	5'-11"	3'- 6¾"	0'- 1⅞"	4	15'- 8"
K	4	16'- 6"	4	11'- 1"	3'-11⅞"	3'- 6⅝"	2	4	5'- 5"	2'- 7"	0'- 2⅛"	6'- 5"	3'- 7"	0'- 2⅛"	4	16'- 9"
L	4	17'- 6"	4	11'- 9"	4'- 2⅞"	3'- 9¼"	2	4	5'- 5"	2'- 7"	0'- 2"	6'- 5"	3'- 7"	0'- 2"	4	17'- 9"
M	4	18'- 6"	4	13'- 4"	3'- 9¼"	4'- 9¼"	2	4	4'-11"	2'- 5¾"	0'- 2¼"	5'-11"	3'- 5¾"	0'- 2¼"	4	18'-10"
N	4	18'- 6"	4	13'- 4"	3'- 9¼"	4'- 9¼"	2	4	4'-11"	2'- 5¾"	0'- 2¼"	5'-11"	3'- 5¾"	0'- 2¼"	4	18'-10"
O	4	19'- 6"	4	14'- 9"	3'- 5⅝"	3'- 9¼"	2	4	5'- 4"	2'- 6⅜"	0'- 2⅝"	6'- 4"	3'- 6¾"	0'- 2⅝"	4	19'-11"
P	4	20'- 6"	4	16'- 1"	3'- 2½"	4'- 3½"	2	4	4'- 6"	2'- 6⅜"	0'- 2⅝"	5'- 6"	3'- 6⅜"	0'- 2⅝"	4	21'- 0"
Q	4	21'- 6"	4	16'-10"	3'- 4¾"	4'- 5¾"	2	4	4'- 7"	2'- 6"	0'- 2½"	5'- 7"	3'- 6"	0'- 2½"	4	21'-11"
R	4	22'- 6"	4	18'- 1"	3'- 2"	3'- 8¾"	2	4	4'-11"	2'- 6⅛"	0'- 2⅝"	5'-11"	3'- 6⅛"	0'- 2⅝"	4	23'- 0"
S	4	23'- 6"	4	19'- 4"	3'- 0"	4'- 1"	2	4	5'- 4"	2'- 7"	0'- 2¾"	6'- 4"	3'- 7"	0'- 2¾"	4	24'- 1"
T	4	24'- 6"	4	20'- 2"	3'- 1½"	4'- 3⅛"	2	4	4'- 6"	2'- 6⅜"	0'- 2⅝"	5'- 6"	3'- 6⅜"	0'- 2⅝"	4	25'- 1"
U	4	25'- 6"	4	21'- 5"	2'-11⅞"	3'- 8¼"	2	4	5'- 1"	2'- 6⅞"	0'- 2¾"	6'- 1"	3'- 6⅞"	0'- 2¾"	4	26'- 2"
V	4	26'- 6"	4	22'- 7"	2'-10½"	3'-11½"	2	4	5'- 2"	2'- 6⅜"	0'- 2⅝"	6'- 2"	3'- 6⅜"	0'- 2⅝"	4	27'- 3"
W	4	27'- 5"	4	23'- 9"	2'- 8¼"	3'- 6¼"	2	4	5'- 4"	2'- 7"	0'- 3"	6'- 4"	3'- 7"	0'- 3"	4	28'- 4"
X	4	28'- 6"	4	25'- 1"	2'- 4⅞"	3'- 2⅞"	2	4	5'- 1"	2'- 6⅜"	0'- 3⅜"	6'- 1"	3'- 6⅜"	0'- 3⅜"	4	29'- 7"
Y	4	29'- 6"	4	26'- 5"	2'- 2"	3'- ⅞"	2	4	5'- 3"	2'- 6⅜"	0'- 3⅝"	6'- 3"	3'- 6⅜"	0'- 3⅝"	4	30'-10"
Z	4	30'- 6"	4	27'- 5"	2'- 2"	3'- 1⅞"	2	4	5'- 4"	2'- 6⅛"	0'- 3⅞"	6'- 4"	3'- 6⅛"	0'- 3⅞"	4	31'-11"
AA	4	31'- 6"	4	28'- 6"	2'- 1⅞"	2'-11⅛"	2	4	5'- 8"	2'- 6⅛"	0'- 3⅞"	6'- 8"	3'- 6⅛"	0'- 3⅞"	4	33'- 0"
BB	4	32'- 6"	4	29'- 9"	1'-11⅛"	2'- 9⅜"	2	4	6'- 3"	2'- 7"	0'- 4"	7'- 3"	3'- 7"	0'- 4"	4	34'- 3"
CC	4	33'- 6"	4	30'- 9"	1'-10⅞"	2'-10⅝"	2	4	6'- 8"	2'- 6⅛"	0'- 4⅛"	7'- 8"	3'- 6⅛"	0'- 4⅛"	4	35'- 4"
DD	4	34'- 6"	4	31'-10"	1'-11⅛"	2'- 8⅜"	2	4	6'- 0"	2'- 6⅞"	0'- 4⅛"	7'- 0"	3'- 6⅞"	0'- 4⅛"	4	36'- 6"
EE	4	35'- 6"	4	32'-10"	1'-10⅞"	2'- 9⅞"	2	4	6'- 5"	2'- 6⅛"	0'- 4⅛"	7'- 5"	3'- 6⅛"	0'- 4⅛"	4	37'- 7"

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STRUCTURE AND BRIDGE DIVISION

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

1006.18

ENGINEERING CONCEPTS, INC.
20 S. ROANOKE ST., PO BOX 619
FINCASTLE, VIRGINIA 24090
540.473.1253 FAX: 540.473.1254

AS-BUILT

Drawn	HTB
Designed	VDOT
Checked	WPJ
Approved	JST

GREENFIELD PARKWAY
PHASE 1

VDOT STANDARD DETAILS
BOX CULVERT WING DETAILS

NOT TO SCALE
NOVEMBER 12, 1997
PROJECT: 97042