TABLE OF DIMENSIONS & REINFORCING STEEL (Wings for One Structure End) Estimated 3 Quantities Variable Dimensions Reinforcing per ft of wing length Bars Ji Bars Ja Maximum (2~Wings) Vingwal Conc Reinf He i ght Spa Spa (Lb/F+) (CY/F+ #4 1'-0" #4 1'-0" 33.73 0.248 #4 |1′-0"| #4 |1′-0" | 3'-0" 2'- 5" 1'- 0" 37.07 | 0.261 #4 1'-0" #4 1'-0" 37.74 0.273 7" #4 1'-0" #4 1'-0" 38.41 0.285 4'-0" 2'- 5" 1'- 0" 9" 4'-6" 3'- 2" 1'- 6" 1'- 0" 7" #4 | 1'-0" | #4 | 1'-0" | 41.75 | 0.330 5'-0" #4 1'-0" #4 1'-0" <u>3' - 2" | 1' - 6</u>" | 1' - 0" 45.09 0.343 3'- 2" 1'- 6" 1'- 0" 7" #4 1'-0" #4 1'-0" 45.75 0.355 6'-0" 3'- 2" 1'- 6" 1'- 0" 7" #4 1'-0" #4 1'-0" 46.42 0.367 7'-0" 3'- 8" 1'- 9" 1'- 3" 7" #4 1'-0" #4 1'-0" 52.77 0.414 2'- 0" 1'- 6' #5 1'-0" #4 1'-0" 60.19 0.486 9'-0" 4'- 8" 2'- 3" 1'- 9" 8" #4 6" #4 6" 81.49 0.535 10'-0" 5'- 2" 2'- 6" 2'- 0" 8" #5 6" #4 6" 97.25 0.584 6" #5 6" 133.65 0.634 11'-0" 5'- 8" 2'- 9" 2'- 3" 8" #6 | 12'-0" 6'- 2" 3'- 0" 2'- 6" 6" | #5 | 6" 162.29 0.721 13'-0" 6'- 8" 3'- 3" 2'- 9" 6" #5 11" #7 6" 178.80 0.856 14'-0" | 7'- 2" | 3'- 6" | 3'- 0" | 1'- 0" | #8 | 6" #5 6" 216.78 0.959 15'-0" 7'-8" 4'-0" 3'-0" 1'-1" #9 6" #6 6" 283.06 1.068 16'-0" 8'-2" 4'-6" 3'-0" 1'-3" #9 6" #6 6" 297.02 1.234 Finished Grade (Roadway Slope) <u>ن</u>

TA	TABLE OF WINGWALL REINFORCING (2~Wings)			
Bar	Size	No.	Spa	
D	#5	~	1 ′ -0"	
Ε	#4	~	1 ′ -0"	
F	#4	~	1'-0"	
G	#6	4	~	
М	#4	4	~	
Р	#4	~	1 ′ -0"	
R	#5	6	~	

#4

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1′-6"
Q	#4	1	~
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION CALCULATIONS:

Formulas: (All values are in Feet) Hw = H + T + C - 0.250'A = (Hw - 0.333') (SL)B = (A) Tanaent (30°)Lw = (A) : Cosine (30°) For Cast-in-place culverts: L+w = (N) (S) + (N+1) (U)For Precast culverts: L+w = (N) (2U+S) + (N-1) (0.500')Total Wingwall Area (Two Wings ~ S.F.)=(Hw + 0.333′) (Lw)

= Height of Wingwall

SL:1 = Side Slope Ratio (Horizontal:1 Vertical)

Lw = Length of Wingwall
Ltw = Culvert Toewall Length = Number of Culvert Spans

See applicable box culvert standard for H, S, T, and U values.

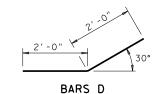
Length of Wings

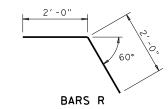
based on SL:1

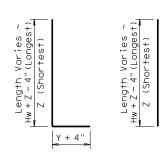
slope alona

PLAN

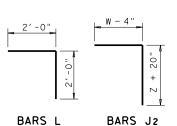
(Showing dimensions.)











- (1) Extend Bars P 3'-0" minimum into bottom slab of Box Culvert.
- Adjust to fit as necessary to maintain $1 \frac{1}{4}$ " clear cover and 4" minimum between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values
- Recommended values of Slope are: 2:1, 3:1, 4:1, & 6:1.
- When shown elsewhere on the plans, a 5" deep concrete riprap shall be constructed. Unless otherwise shown on the plans or directed by the Engineer, the riprap shall have a 6" wide by 1'-6" deep reinforced concrete toewall along all edges adjacent to natural ground; the toewall shall be reinforced by extending typical riprap reinforcing into the toewall; construction joints or grooved joints, oriented in the direction of flow, shall extend across the full distance of the riprap, at intervals of approximately 20'. When such riprop is provided, the culvert toewall shown in SECTION B-B will not be required. Payment for riprop shall be as required by Item 432, "Riprop".
- At Contractor's option, Culvert Toewall may be ended flush with Wingwall Toewall. Adjust reinforcing from that shown as necessary.
- (7) 0" min to 5′-0" max. For T6 or C6 Rail, see T6-CM standard for additional details. For all other rail types, refer to the RAC standard. For curbs without rail and greater than 1'-0" high, see ECD standard for additional details. Estimated curb heights are shown elsewhere in the plans.
- 8 For vehicle safety, curb heights and wall heights shall be reduced, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.

GENERAL NOTES:

Designed according to current AASHTO Standard and Interim Specifications.

All reinforcing steel shall be Grade 60.

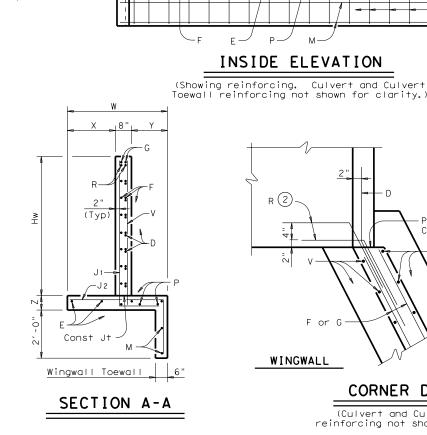
All concrete shall be Class "C" and shall have a minimum compressive strength of 3600 psi.

All reinforcing bars shall be adjusted to provide a minimum of 1 ½" clear cover.

When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced

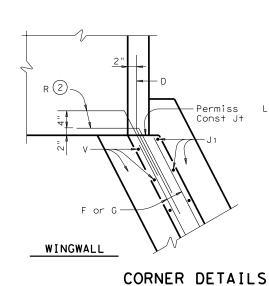
or eliminated as directed by the Engineer. See BCS sheet for additional dimensions and

information. The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.



of this standard is governed ranty of any kind is made by s no responsibility for the s or for incorrect results or

I

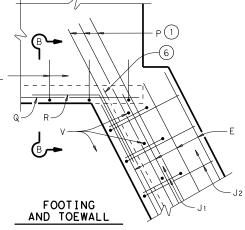


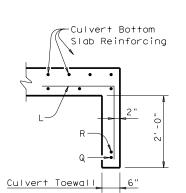
(Culvert and Culvert Toewall reinforcing not shown for clarity.)

Conforms to Slope

INSIDE ELEVATION

perpendicular to Rdwy (4)





Toe of

Slope -

See Corner

Details

SECTION B-B (5)



O° SKEW BOX CULVERTS

FW-0 ILE: fw-Ostde.dgn DN: GAF CK: CAT DW: TXDOT CK: GAF C)TxDOT May 2005 DISTRICT FEDERAL AID PROJECT SHEET REVISIONS