

FILE: D206-DRAINCAL06-12209.dwg

CULVERT - LINE 'U' DESIGN CALCULATIONS																												
Culvert Location: <u>Culvert - Line 'U'</u>											RDWY. Elev. <u>599.50</u>				U.S. Culv. F.L. <u>592.5</u>													
Total Discharge, Q (cfs) <u>165.4</u>											Design Storm Freq. <u>100 yr</u>				U.S. Culv. F.L. <u>592.90</u>				D.S. Culv. F.L. <u>592.2</u>									
Roughness Coeff., n <u>0.015</u>											Max. Vel. (ft/s) <u>12.0</u>				Difference <u>6.60</u> ft				Difference <u>0.3</u>									
Tailwater (ft) <u>2.0</u>											D.S. Channel Width (ft) <u>12.0</u>				Req'd Freeboard <u>1.00</u> ft				Length (ft) <u>67</u>									
Entrance Description: <u>Type 2A, 90° Headwall</u>											Allow. Headwater <u>5.60</u> ft				Culv. Slope, $s_c = \frac{Diff Ft}{Length Ft}$ <u>0.45%</u>													
Trial Area of Opening T <sup>2</sup> A=Q/V (sq. ft.)	Channel Width "W" (feet)	DEPTH RANGE		Trial Depth "D" (feet)	POSSIBLE CULVERT SIZES					INLET CONTROL					HEADWATER CALCULATION										The Greater Controlling Head Water (Inlet or Outlet) (feet)	Selected Conduit Size (feet)		
		T <sup>2</sup> Ac/W (feet)	AHW (feet)		No. Openings	Width of Box "B" (feet)	Box Depth or Pipe Diameter "D" (feet)	Total Culvert Area "Ac" (sq. ft.)	"Q" Each Opening (c.f.s.)	Entrance Type	Case NO.	Q/B (c.f.s.)	HWD	"HW" (feet)	Entrance Coeff. Ke	CASE III					CASE IV							
																"H" (feet)	"TW" (feet)	LxSo (feet)	"HW" (feet)	"H" (feet)	ho=dc+D/2 or ho=TW (use larger)						LxSo	"HW" (feet)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
13.78	12.00	1.15	5.60	3.00	1.00	7.00	3.00	21.00	165.40	Type 2A	Case 2	23.63	1.60	4.80	0.50	1.80	2.00	0.30	3.50	1.80	2.60	2.80	2.00	2.80	0.30	4.30	4.80	7'x3' Box

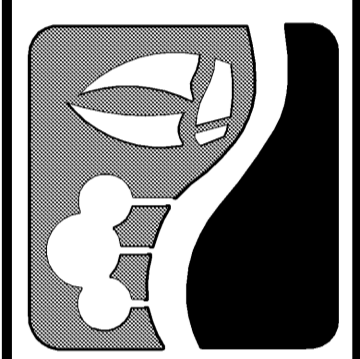
CULVERT - LINE 'V' DESIGN CALCULATIONS																												
Culvert Location: <u>Culvert - Line 'V'</u>											RDWY. Elev. <u>581.31</u>				U.S. Culv. F.L. <u>575.3</u>													
Total Discharge, Q (cfs) <u>199.6</u>											Design Storm Freq. <u>100 yr</u>				U.S. Culv. F.L. <u>575.30</u>				D.S. Culv. F.L. <u>575</u>									
Roughness Coeff., n <u>0.015</u>											Max. Vel. (ft/s) <u>12.0</u>				Difference <u>6.01</u> ft				Difference <u>0.3</u>									
Tailwater (ft) <u>2.5</u>											D.S. Channel Width (ft) <u>12.0</u>				Req'd Freeboard <u>1.00</u> ft				Length (ft) <u>67</u>									
Entrance Description: <u>Type 2A, 90° Headwall</u>											Allow. Headwater <u>5.01</u> ft				Culv. Slope, $s_c = \frac{Diff Ft}{Length Ft}$ <u>0.45%</u>													
Trial Area of Opening T <sup>2</sup> A=Q/V (sq. ft.)	Channel Width "W" (feet)	DEPTH RANGE		Trial Depth "D" (feet)	POSSIBLE CULVERT SIZES					INLET CONTROL					HEADWATER CALCULATION										The Greater Controlling Head Water (Inlet or Outlet) (feet)	Selected Conduit Size (feet)		
		T <sup>2</sup> Ac/W (feet)	AHW (feet)		No. Openings	Width of Box "B" (feet)	Box Depth or Pipe Diameter "D" (feet)	Total Culvert Area "Ac" (sq. ft.)	"Q" Each Opening (c.f.s.)	Entrance Type	Case NO.	Q/B (c.f.s.)	HWD	"HW" (feet)	Entrance Coeff. Ke	CASE III					CASE IV							
																"H" (feet)	"TW" (feet)	LxSo (feet)	"HW" (feet)	"H" (feet)	ho=dc+D/2 or ho=TW (use larger)						LxSo	"HW" (feet)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
16.63	12.00	1.39	5.01	3.00	2.00	5.00	3.00	30.00	99.80	Type 2A	Case 2	19.96	1.36	4.08	0.50	1.20	2.53	0.30	3.43	1.20	2.30	2.65	2.53	2.65	0.30	3.55	4.08	(2) 5'x3' Box

CULVERT - LINE 'W' DESIGN CALCULATIONS																												
Culvert Location: <u>Culvert - Line 'W'</u>											RDWY. Elev. <u>589.05</u>				U.S. Culv. F.L. <u>582.3</u>													
Total Discharge, Q (cfs) <u>369.6</u>											Design Storm Freq. <u>100 yr</u>				U.S. Culv. F.L. <u>582.30</u>				D.S. Culv. F.L. <u>582</u>									
Roughness Coeff., n <u>0.015</u>											Max. Vel. (ft/s) <u>12.0</u>				Difference <u>6.75</u> ft				Difference <u>0.3</u>									
Tailwater (ft) <u>2.6</u>											D.S. Channel Width (ft) <u>12.0</u>				Req'd Freeboard <u>1.00</u> ft				Length (ft) <u>67</u>									
Entrance Description: <u>Type 2A, 90° Headwall</u>											Allow. Headwater <u>5.75</u> ft				Culv. Slope, $s_c = \frac{Diff Ft}{Length Ft}$ <u>0.45%</u>													
Trial Area of Opening T <sup>2</sup> A=Q/V (sq. ft.)	Channel Width "W" (feet)	DEPTH RANGE		Trial Depth "D" (feet)	POSSIBLE CULVERT SIZES					INLET CONTROL					HEADWATER CALCULATION										The Greater Controlling Head Water (Inlet or Outlet) (feet)	Selected Conduit Size (feet)		
		T <sup>2</sup> Ac/W (feet)	AHW (feet)		No. Openings	Width of Box "B" (feet)	Box Depth or Pipe Diameter "D" (feet)	Total Culvert Area "Ac" (sq. ft.)	"Q" Each Opening (c.f.s.)	Entrance Type	Case NO.	Q/B (c.f.s.)	HWD	"HW" (feet)	Entrance Coeff. Ke	CASE III					CASE IV							
																"H" (feet)	"TW" (feet)	LxSo (feet)	"HW" (feet)	"H" (feet)	ho=dc+D/2 or ho=TW (use larger)						LxSo	"HW" (feet)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
30.80	12.00	2.57	5.75	3.00	2.00	6.00	4.00	48.00	184.80	Type 2A	Case 2	30.80	1.38	5.52	0.50	1.50	2.59	0.30	3.79	1.50	3.20	3.60	2.59	3.60	0.30	4.80	5.52	(2) 6'x4' Box

**RECORD  
DRAWING  
02/02/2015**

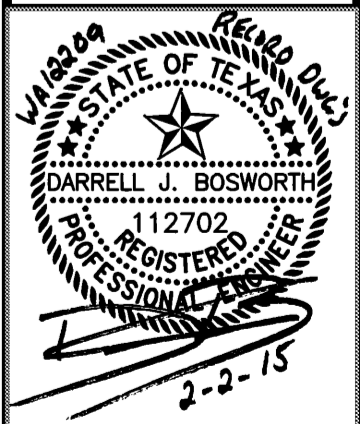
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