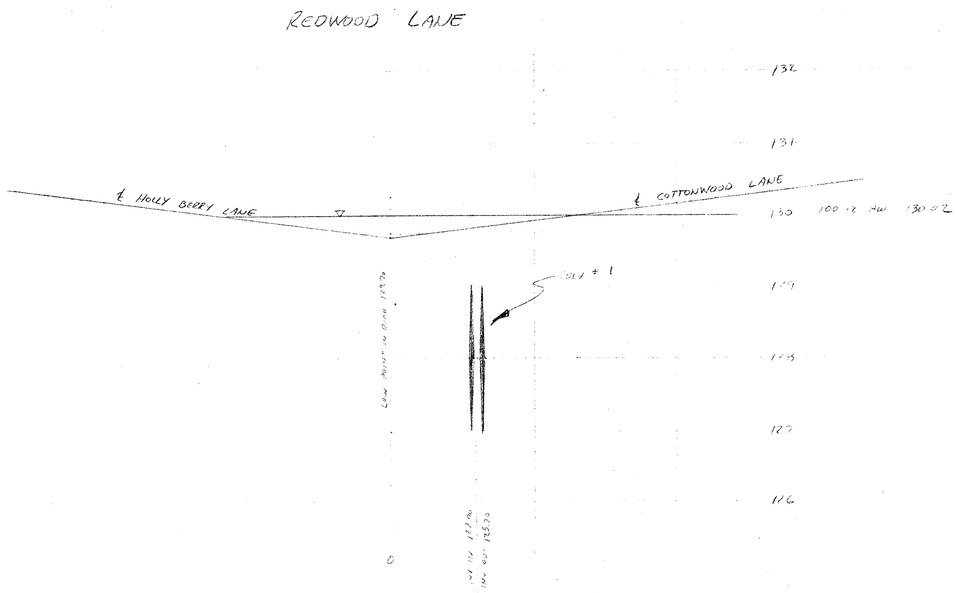


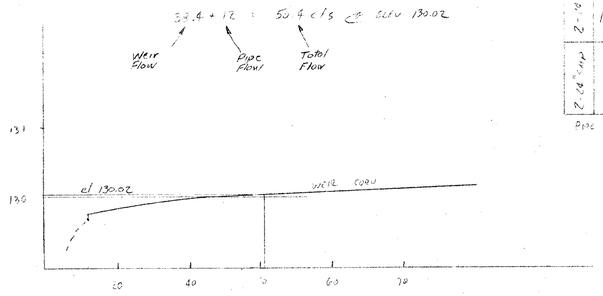
Weir Table

WATER ELEVATION	C	h	H	$H^{3/2}$	L	Q
127.25	3.0	.05	.03	.01	20	3.7
130.00	3.0	.30	.30	.09	120	32.2
130.50	3.0	.55	.37	.22	225	44.9
130.02	3.0	.32	.21	.10	30	32.4

Actual Q_{100} = 49.4 .

32.4 + 17 = 50.4 cfs @ ELEV 130.02

Weir Flow — Pipe Flow — Total Flow



Tailwater Calculation
for Roadside ditch downstream of culverts

Q_{100} = 49.4 in Ditch (see Drainage calc. sheet 5 of 5)

WP = 22.45 ; A = 39.73 ; R = 0.66

$Q = \frac{1.49}{.05}(39.73)(0.66)^{2/3}(.004)^{1/2}$ = 49.4 cfs

h_o = 3.15'

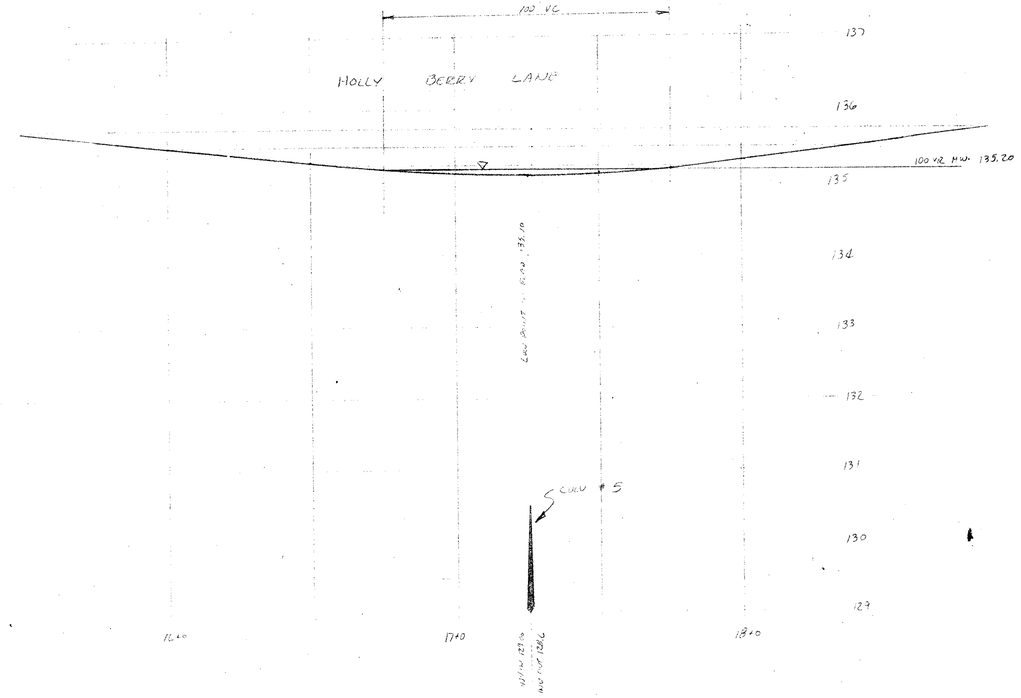
SIZE	CULVERT HEADWATER COMPUTATION										CONTROLLING FLOW	OUTLET VELOCITY
	INLET CONTROL		OUTLET CONTROL				HW = H + h_o − LS					
	HW/D	HW	K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS	HW		
2-24" Corr	1.75	2.46	.9	.4	1.35	1.08	3.15	3.15	1.3	3.25		
2-24" Corr				.85				3.15	1.3	2.7		

PIPE UNABLE TO CARRY TOTAL Q_{100} FLOW TODS ROAD

HW = H + h_o − LS

H = HW − h_o + LS = 2.7 − 3.15 + 1.3 = .85

.85 ⇒ 12 cfs

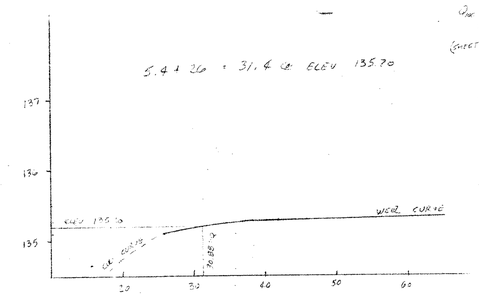


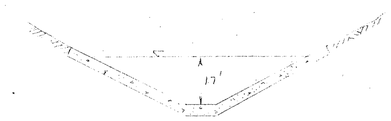
FUTURE DESIGN

Q = CH^3/2 L

WATER ELEVATION	C	h	H	$H^{3/2}$	L	Q
135.25	3.0	.15	.10	.03	120	10.8
135.50	3.0	.4	.27	.14	235	18.7
135.75	3.0	.65	.51	.36	340	36.72
135.20	3.0	.10	.07	.02	40	5.4

5.4 + 26 = 31.4 @ ELEV 135.70





Q_{100} = 37.15 cfs in Ditch (see Drainage calc sheet 2 of 5)

h_o = 28.4" ⇒ TW ELEV 130.30 or 1.7

SIZE	CULVERT HEADWATER COMPUTATION										CONTROLLING FLOW	OUTLET VELOCITY
	INLET CONTROL		HW = H + h_o − LS									
	HW/D	HW	K_e	H	d_c	$\frac{d_c+D}{2}$	TW	h_o	LS	HW		
2-18"	4.5	6.45	.5	3.5	1.47	1.49	1.70	1.70	.4	7.8		
2-18"				4.8				1.70	.4	6.1		

PIPE UNABLE TO CARRY TOTAL Q_{100} FLOW TODS ROAD

Q_{100} = 37.15 + 10.8 = 47.95 (sheet 2 of 5)

HW = H + h_o − LS

H = HW − h_o + LS = 6.1 − 1.70 + .4 = 4.8

4.8 ⇒ 26 cfs

CULVERT HEADWATER CALCULATIONS