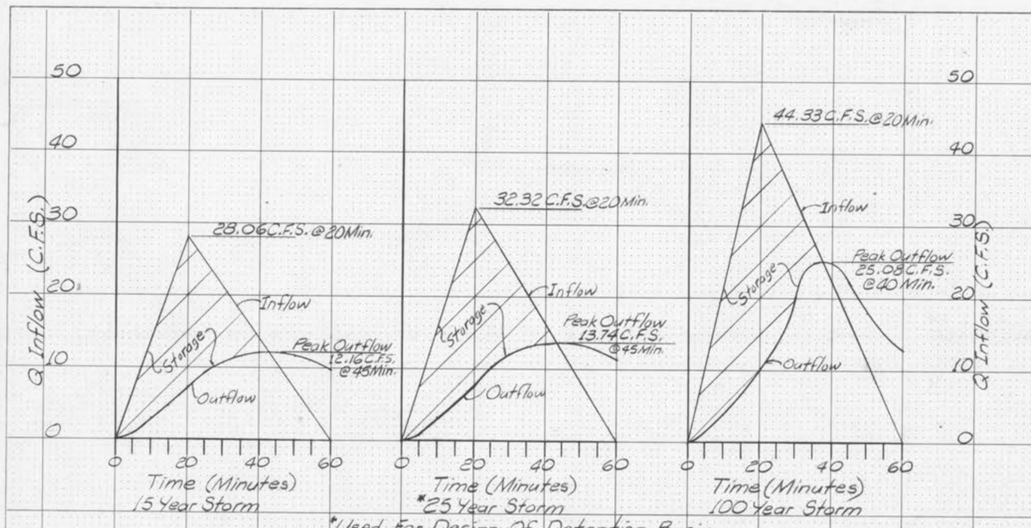
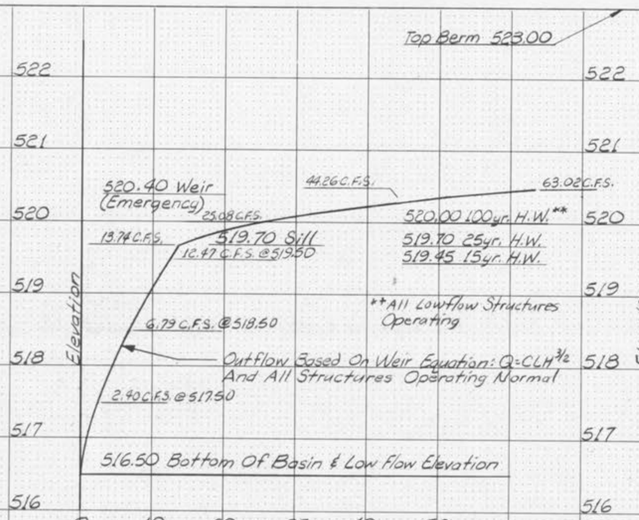


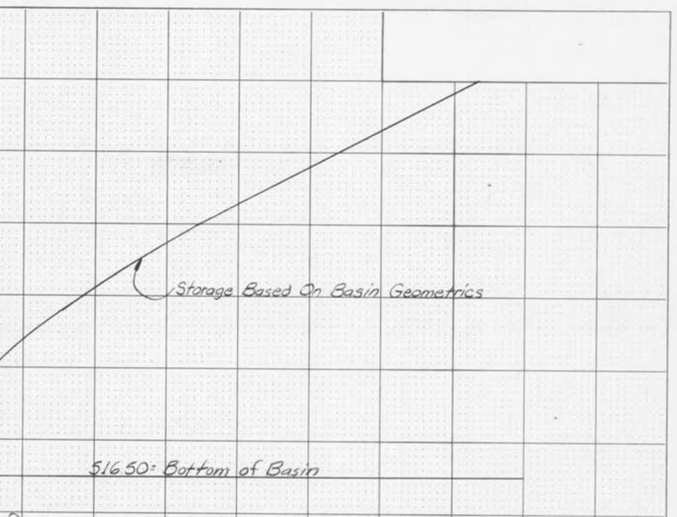
*Used For Design Of Detention Basin

INFLOW / OUTFLOW HYDROGRAPHS



ELEVATION VS. DISHARGE

(Based Upon Hydraulics of Discharge Structures)



ELEVATION VS. STORAGE

TIME	INFLOW			OUTFLOW			STORAGE	
MIN	CFS	CF INCRE	CF CUMUL	CFS	CF INCRE	CF CUMUL	CF CUMUL	ELEV
0	0	1053	0	0	231	0	0	516.50
5	7.02	3158	1053	.77	900	231	822	516.97
10	14.03	5262	4211	3.00	1458	1131	3080	517.66
15	21.05	7367	9473	4.86	2145	2589	6884	518.10
20	28.06	7892	16840	7.15	2760	4734	12106	518.57
25	24.55	6840	24732	9.20	3213	7494	17238	518.95
30	21.05	5789	31572	10.71	3519	10707	20865	519.21
35	17.54	4736	37361	11.73	3648	14226	23135	519.38
40	14.03	3683	42097	12.16	3648	17874	24223	519.45
45	10.52	2631	45780	12.16	3537	21522	24258	519.45
50	7.02	1580	48411	11.79	3318	25059	23352	519.39
55	3.51	527	49991	11.06	2967	28377	21614	519.27
60	0		50517	9.89		31344	19173	519.07

15 YEAR STORM

TIME	INFLOW			OUTFLOW			STORAGE	
MIN	CFS	CF INCRE	CF CUMUL	CFS	CF INCRE	CF CUMUL	CF CUMUL	ELEV
0	0	12.12	0	0	.85	0	0	516.50
5	8.08	3636	1212	.85	3.39	255	957	517.00
10	16.16	6060	4848	3.39	5.37	1017	3576	517.76
15	24.24	8484	10908	5.37	7.89	2367	8025	518.21
20	32.32	9090	19392	7.89	10.35	3105	14142	518.71
25	28.28	7878	28482	10.35	12.6	3648	20127	519.15
30	24.24	6666	36360	12.6	15.23	3969	24357	519.45
35	20.20	5454	43026	15.23	13.67	4101	27084	519.62
40	16.16	4242	48480	13.67	13.74	4122	28407	519.69
45	12.12	3030	52722	13.74	13.42	4026	29527	519.70
50	8.08	1818	55752	13.42	12.60	3780	28221	519.65
55	4.04	606	57570	12.60	11.49	3447	27537	519.52
60	0		58176	11.49		35448	22728	519.34

*25 YEAR STORM

TIME	INFLOW			OUTFLOW			STORAGE	
MIN	CFS	CF INCRE	CF CUMUL	CFS	CF INCRE	CF CUMUL	CF CUMUL	ELEV
0	0	1662	0	0	468	0	0	516.50
5	11.08	4988	1662	1.56	1194	468	1195	517.25
10	22.17	8313	6650	3.38	2037	1662	4388	517.90
15	33.25	11637	14963	6.79	3087	3699	11264	518.50
20	44.33	12468	26600	10.29	4083	6786	19814	519.14
25	38.09	10806	39068	13.67	6042	10869	28199	519.63
30	33.25	9144	49874	20.14	7524	16911	32963	519.90
35	27.71	7432	59018	25.08	6750	24435	34583	520.00
40	22.17	5819	66500	25.08	5409	31959	34541	520.00
45	16.62	4155	72319	22.50	4575	38709	33610	519.95
50	11.08	2493	76474	18.03	3891	44118	32336	519.85
55	5.54	831	78967	15.25		48693	30274	519.77
60	0		79798	12.97		52584	27214	519.58

100 YEAR STORM

BASIN VOLUME (BASED ON GEOMETRICS OF BASIN)			
ELEV.	AREA SQ. FT.	INCREMENTAL VOLUME	CUMULATIVE VOLUME CU. FT.
516.50	0		0
.5'		244	
517.0	975		244
1.0'		5363	
518.0	9750		5607
1.0'		12525	
519.0	15300		18132
1.0'		16300	
520.0	17300		34432
2.0'		38650	
522.0	21350		73082

LOW FLOW OPENING (25 YR.)
- 0.80' OPENING CAST IN STRUCTURE (Weir) (SEE DETAIL ON SHEET 16 OF 22)
- FLOWLINE ELEV. = 516.50
- TOP = 519.70

PRIMARY OVERFLOW (25 YR.)
- STRUCTURE WITH SILL OF 19' (Weir Length) (SEE DETAIL ON SHEET 16 OF 22)
- SILL ELEV. = 519.70
- TOP = 521.45

EMERGENCY OVERFLOW (100 YR.)
- RIP RAP WEIR 32' LENGTH
- FLOWLINE ELEV. = 520.40
- TOP BERM = 523.00

WEIR EQUATION = $Q = CLH^{3/2}$

WHERE: C = 3.0, L = 32, Q = 44.33 cfs.
SOLVE FOR H = 0.60'
0.60' + 520.40 = 521.00
523.00 − 521.00 = 2' FREEBOARD

@ 100 year Discharge, Assuming "Low flow" Structure (Weir/Inlet) Not Functioning.

WEST WATERSHED = 16.64 ACRES (EXISTING TRIBUTARY WATERSHED)

UNDEVELOPED RUN-OFF :

(15 YEAR STORM) = 16.64 AC. X 1.87 C.F.S./AC. = 31.12 C.F.S.
(25 YEAR STORM) = 16.64 AC. X 2.15 C.F.S./AC. = 35.78 C.F.S.*
(100 YEAR STORM) = 16.64 AC. X 2.95 C.F.S./AC. = 49.09 C.F.S.

DEVELOPED RUNOFF :

(15 YEAR STORM) = 16.64 AC. X 2.64 C.F.S./AC. = 43.93 C.F.S.
(25 YEAR STORM) = 16.64 AC. X 3.04 C.F.S./AC. = 50.59 C.F.S.*
(100 YEAR STORM) = 16.64 AC. X 4.17 C.F.S./AC. = 69.39 C.F.S.

TOTAL "Q" TO BASIN :

(15 YEAR STORM) = 10.63 AC. X 2.64 C.F.S./AC. = 28.06 C.F.S.
(25 YEAR STORM) = 10.63 AC. X 3.04 C.F.S./AC. = 32.32 C.F.S.*
(100 YEAR STORM) = 10.63 AC. X 4.17 C.F.S./AC. = 44.33 C.F.S.

TOTAL " Q" OF SITE BY-PASSING BASIN # 2 :

(15 YEAR STORM) = 6.92 AC. X 2.64 C.F.S./AC. = 18.27 C.F.S.
(25 YEAR STORM) = 6.92 AC. X 3.04 C.F.S./AC. = 21.04 C.F.S. *
(100 YEAR STORM) = 6.92 AC. X 4.17 C.F.S./AC. = 28.86 C.F.S.

MAXIMUM "Q" ALLOWED TO BE ROUTED THROUGH DETENTION BASIN # 2 :

(15 YEAR STORM) = 31.12 C.F.S. - 18.27 C.F.S. = 12.85 C.F.S.
(25 YEAR STORM) = 35.78 C.F.S. - 21.04 C.F.S. = 14.74 C.F.S.*
(100 YEAR STORM) = 49.09 C.F.S. - 28.86 C.F.S. = 20.23 C.F.S.

* 25 YEAR STORM WAS USED AS THE DESIGN STORM FOR BASIN # 2 LOW FLOW DESIGN AND OVER FLOW DESIGN, THE 100 YEAR STORM WAS USED FOR THE EMERGENCY OVER FLOW DESIGN.

{ 0.91 Acres Additional Watershed Regraded To Be Tributary To West

LAKEVIEW

DETENTION CALCULATIONS (BASIN # 2)

HALL, HALSEY & WIND
LAND PLANNING
CIVIL ENGINEERING
LANDSCAPE ARCHITECTURE
10620 SUNSET OFFICE DRIVE, SUITE 208, ST. LOUIS, MO 63127 · 314/966-5577

Drawn By	Checked By	Project Number	Sheet Number
VLB	DCW	86025	18 OF 22

Date 2/28/87

Revisions City 5-21-87