

PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr.
St. Peters, MO 63376

441-1211
278-1211

PROJECT NAME CALUMET RANCH - EAST
PROJECT #/JOB ORDER # 92120A
DATE 7-13-98
DESIGNER KJD
PAGE 1

DETENTION BASIN "A"

EXISTING Q TO BASIN "A"	= 71.62 CFS
DEVELOPED Q TO BASIN "A"	= 82.87 CFS
STORAGE REQUIRED	11.25 CFS STORAGE
ALLOWABLE RELEASE	71.62 CFS
ACTUAL RELEASE	41.95 CFS

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BASIN "A" WEIR CALCULATIONS

ALL OFFSITE FOR POTENTIAL BASIN A IS ON SITE
AT CALUMET RANCH WEST

INFLOW FOR 100YR 20 MIN

54.97 CFS

HW 536.60

0.75'

25'
B

$$Q = 3.367(b)(H)^{3/2}$$

$$54.97 = 3.367(25)(H)^{3/2}$$

$$(H)^{3/2} = \frac{54.97}{84.17}$$

$$[(H)^{3/2}]^{2/3} = [0.653]^{2/3}$$

$$H = 0.75'$$

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DETENTION BASIN "B"

EXISTING Q TO BASIN "B"	=	261.22
DEVELOPED Q TO BASIN "B"	=	272.58
STORAGE REQUIRED		11.36 CFS
ALLOWABLE RELEASE		261.22 CFS
ACTUAL RELEASE		189.33

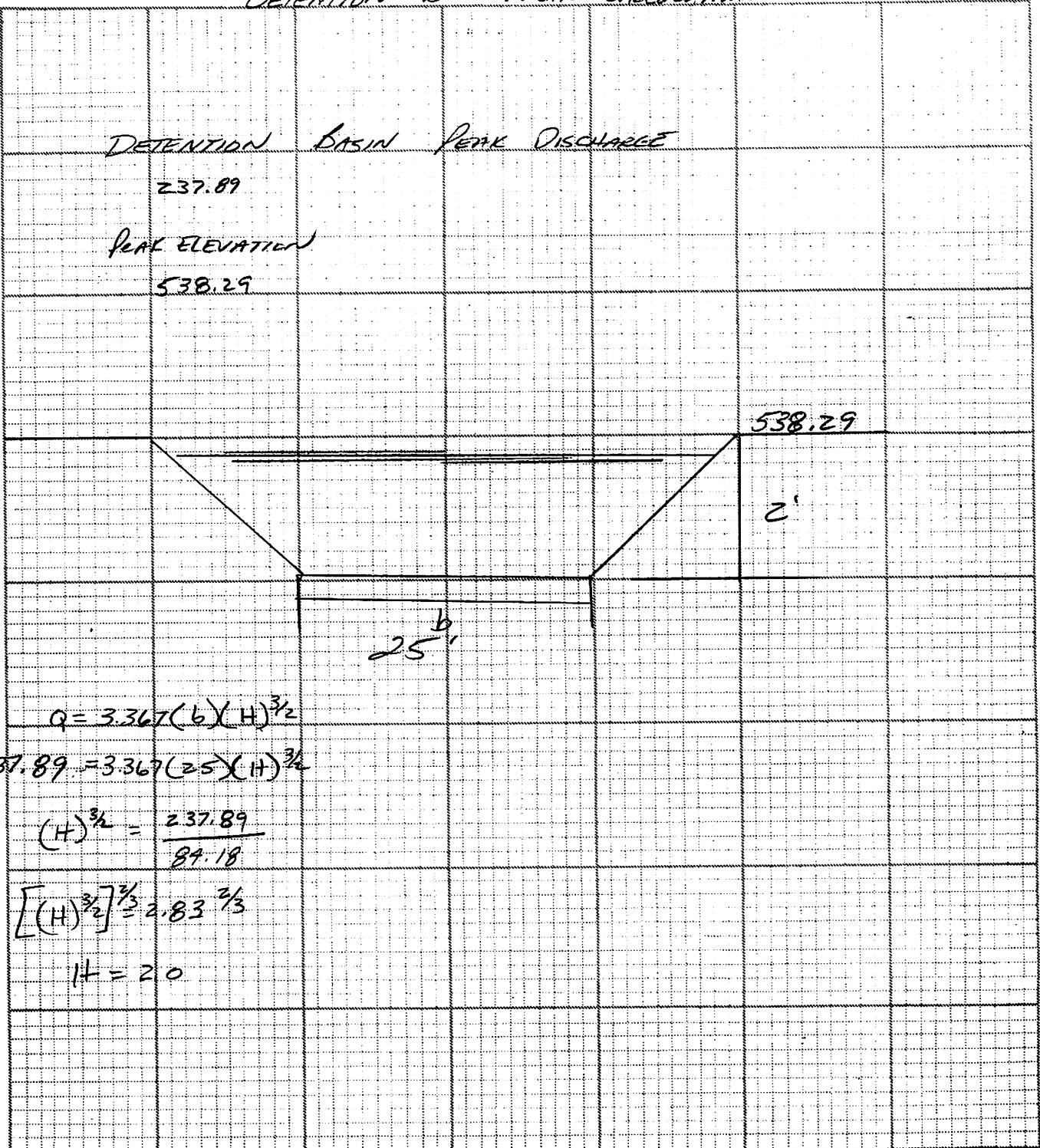
DETENTION "B" WEIR CALCULATIONS

DETENTION BASIN PEAK DISCHARGE

237.89

PEAK ELEVATION

538.29



$$Q = 3.367(b)(H)^{3/2}$$

$$237.89 = 3.367(25)(H)^{3/2}$$

$$(H)^{3/2} = \frac{237.89}{84.18}$$

$$[(H)^{3/2}]^{2/3} = 2.83^{2/3}$$

$$H = 2.0$$

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PROJECT #/JOB ORDER # 92120A/31820
DATE 6-01-95
DESIGNER TDR/KJD
PAGE _____

25 YEAR / 20 MIN STORM DESIGN - BASIN A

PREDEVELOPED CONDITIONS:			
OFFSITE	19.62	ACRES @ 2.31	= 45.32 CFS
ONSITE	11.40	ACRES @ 2.31	= 26.37 CFS
TOTAL:	31.02	ACRES	71.65 CFS
POST DEVELOPED CONDITIONS:			
OFFSITE	16.51	ACRES @ 3.26	= 53.82 CFS
	2.42	ACRES @ 2.31	= 5.59 CFS
ONSITE	5.99	ACRES @ 3.26	= 19.53 CFS
	1.70	ACRES @ 2.31	= 3.93 CFS
TOTAL:	26.62	ACRES	85.17 CFS
Q ₂₅ TO BASIN "A"			
OFFSITE	18.93	ACRES @ 3.26	= 61.71 CFS
ONSITE	5.99	ACRES @ 3.26	= 19.53 CFS
	1.70	ACRES @ 2.31	= 3.93 CFS
	26.62	ACRES	85.17 CFS
RETENTION REQUIRED:			
85.17 CFS - 71.65 CFS = 13.52 CFS			
13.52 CFS X 30 MIN X 60 SEC/MIN = 24,336 Cu Ft.			
(30 MIN STORAGE CALCULATION USED)			
PEAK INFLOW 10 YEAR / 20 MIN STORM			
1.67	PI FACTOR UNDEVELOPED	Q ₁₀ TO BASIN	
2.35	PI FACTOR UNDEVELOPED	16.51 @ 2.35	= 18.86 CFS
1.67	PI " DEVELOPED	2.42 @ 1.67	= 4.04 CFS
2.35	PI " "	5.99 @ 2.35	= 14.08 CFS
		1.70 @ 1.67	= 2.84 CFS
		TOTAL:	39.82 CFS
PEAK INFLOW 100 YEAR / 20 MIN STORM			
2.91	PI FACTOR UNDEVELOPED	Q ₁₀₀ TO BASIN	
4.17	" " " "	16.51 @ 2.91	= 48.54 CFS
2.95	" " DEVELOPED	2.42 @ 4.17	= 10.09 CFS
4.17	" " " "	5.99 @ 2.95	= 17.67 CFS
		1.70 @ 4.17	= 7.09 CFS
		TOTAL:	83.29 CFS

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DESIGNER TDZ/KD

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25 YEAR / 20 MIN STORM DESIGN - BASIN B

DEVELOPED CONDITIONS:

ONSITE	1.32	@	3.26	=	4.30 CFS
	2.59	@	3.26	=	8.44 CFS
	1.33	@	3.26	=	4.34 CFS
	7.5	@	3.26	=	24.45 CFS
	1.95	@	3.26	=	6.36 CFS
	1.95	@	3.26	=	6.36 CFS
	13.11	@	3.26	=	42.74 CFS
	1.57	@	3.26	=	5.12 CFS
	7.85	@	3.26	=	25.59 CFS
OFFSITE →	25.91	@	2.31	=	62.62 CFS
	12.60	@	2.31	=	29.11 CFS
	7.85	@	2.31	=	11.20 CFS

3.26

82.53 Acres 230.63 CFS

PREDEVELOPED CONDITIONS:

OFFSITE	12.60	@	2.31	=	29.11
	1.77	@	2.31	=	4.09
	13.21	@	2.31	=	30.51
	13.90	@	2.31	=	32.11
	0.83	@	2.31	=	1.92
	2.77	@	2.31	=	6.40
	12.80	@	2.31	=	29.57

ONSITE 24.18 @ 2.31 = 55.86
82.06 Acres 189.56 CFS

Q₂₅ TO BASIN "B"

OFFSITE	82.06 ACRES @ 2.31	=	189.56
ONSITE	39.17 ACRES @ 3.26	=	127.69
	43.36 ACRES @ 2.31	=	100.16
TOTAL	164.59 ACRES		420.19 CFS

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(Basin B)

RETENTION REQUIRED:

$$230.63 \text{ CFS} - 189.56 \text{ CFS} = 41.07 \text{ CFS}$$

$$41.07 \text{ CFS} \times 30 \text{ MIN} \times 60 \text{ SEC/MIN} = 73,926 \text{ CU FT}$$

(30 MIN. STORAGE CALCULATION USED)

PEAK INFLOW 10 YEAR / 20 MIN STORM

1.67 PI FACTOR UNDEVELOPED
2.35 PI FACTOR DEVELOPED

Q₁₀ TO BASIN

43.36 ACRES @ 1.67 = 72.41 CFS
39.17 ACRES @ 2.35 = 92.05 CFS
TOTAL 164.46 CFS

PEAK INFLOW 100 YEAR / 20 MIN STORM

2.95 PI FACTOR UNDEVELOPED
4.17 PI FACTOR DEVELOPED

Q₁₀₀ TO BASIN

43.36 ACRES @ 2.95 = 127.91 CFS
39.17 ACRES @ 4.17 = 163.34 CFS
TOTAL 291.25 CFS

