PICKETT RAY & SILVER

Civil Engineers
Planners
Land Surveyors

333 Mid Rivers Mall Dr
St. Peters, MO 63376

441-1211
278-1211

PROJECT NAME VILLAGES AT DARDENNE- BATES VILLAGE
PROJECT #/JOB ORDER # 95-080 / 34202
DATE 4-22-96
DESIGNER TANYA D. / MARVIN G.
PAGE 1 OF 7

STORMWATER DETENTION BASIN "A"
DESIGN STORM 15 YEAR / 20 MINUTE

TOTAL ACRES OF DEVELOPMENT:

NORTH WATERSHED	=	56.24 Ac
EAST WATERSHED	=	35.31 Ac
TOTAL	=	91.55 Ac.

EXISTING CONDITIONS NORTH WATERSHED FLOW TO CREEK:

56.24 Ac @ 1.87 = 105.17 CFS

POST DEVELOPMENT Q TO BASIN:

OFFSITE (0.71 + 2.49 + 2.13)	=	5.33 Ac @	2.64	= 14.07 CFS
ONSITE	=	14.55 Ac @	2.64	= 38.41 CFS
TOTAL	=	19.88 Ac		= 52.48 CFS

BYPASS BASIN:

ONSITE DEVELOPED	=	21.79 Ac @	2.64	= 57.53 CFS
ONSITE REC. AREA	=	1.06 Ac @	2.64	= 2.80 CFS
ONSITE COMMON GROUND	=	19.17 Ac @	1.87	= 35.85 CFS
TOTAL	=	42.02 Ac		= 96.18 CFS

DETENTION REQUIRED:

52.48 + 96.18 = 148.66 CFS − 105.17 CFS = 43.49 CFS
43.49 × 20 min. × 60 sec/min. = 52,188 CU. FT. VOLUME

ALLOWABLE RELEASE FROM BASIN:

52.48 CFS − 43.49 CFS = 8.99 CFS

95080-13

RECTANGULAR ORIFICE
8 in W X 16 in H ELEV= 505

Outlet Pipe - 40 ft - 30 in pipe
UFL= 505 LFL= 504 n= .013

Overflow Structure - Standpipe
DIAM= 48 in STANDPIPE ELEV= 509.5

PROJECT NAME VILLAGES AT DARDENNE BATES VILLAGE
PROJECT #/JOB ORDER # 95-080 / 34202
DATE 4-22-96
DESIGNER TANYA R. / MARVIN G.
PAGE 2 OF 7

15 YEAR / 20 MIN

VILLAGES AT DARDENNE-BATES VILLAGE 4-19-96 SUBMITTAL DATE: 4-22-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	157.45	157.45	0.00	157.45	505.03
2	314.90	472.35	0.62	471.73	505.10
3	472.35	944.08	3.20	940.88	505.20
4	629.80	1570.68	9.01	1561.67	505.33
5	787.25	2348.92	19.27	2329.65	505.48
6	944.70	3274.35	35.11	3239.24	505.67
7	1102.15	4341.39	57.56	4283.83	505.89
8	1259.60	5543.43	87.55	5455.88	506.04
9	1417.05	6872.93	110.87	6762.06	506.13
10	1574.50	8336.56	125.09	8211.47	506.23
11	1731.95	9943.42	141.53	9801.89	506.33
12	1889.40	11691.29	213.36	11477.93	506.45
13	2046.85	13524.78	230.59	13294.19	506.57
14	2204.30	15498.49	247.91	15250.58	506.70
15	2361.75	17612.33	265.30	17347.03	506.84
16	2519.20	19866.23	282.75	19583.47	506.99
17	2676.65	22260.12	300.26	21959.86	507.15
18	2834.10	24793.96	317.80	24476.16	507.32
19	2991.55	27467.71	335.38	27132.33	507.49
20	3149.00	30281.33	352.99	29928.34	507.68
21	2991.55	32919.89	370.62	32549.27	507.86
22	2834.10	35383.37	386.42	34996.95	508.01
23	2676.65	37673.60	399.95	37273.65	508.11
24	2519.20	39792.85	408.12	39384.73	508.20
25	2361.75	41746.48	415.54	41330.94	508.28
26	2204.30	43535.24	422.27	43112.97	508.36
27	2046.85	45159.82	428.35	44731.47	508.43
28	1889.40	46620.87	433.79	46187.08	508.49
29	1731.95	47919.03	438.62	47480.40	508.54
30	1574.50	49054.90	442.87	48612.03	508.59
31	1417.05	50029.08	446.56	49582.52	508.63
32	1259.60	50842.12	449.70	50392.42	508.67
33	1102.15	51494.57	452.30	51042.27	508.70
34	944.70	51986.97	454.38	51532.59	508.72
35	787.25	52319.84	455.94	51863.90	508.73
36	629.80	52493.70	456.99	52036.71	508.74
37	472.35	52509.06	457.54	52051.53	508.74 ←
38	314.90	52366.43	457.59	51908.85	508.73
39	157.45	52066.30	457.13	51609.17	508.72
40	0.00	51609.17	456.18	51152.99	508.70

PEAK OUTFLOW= 7.63 CFS AT 38 MINUTES

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DATE 4-22-96
DESIGNER TANYA D. / MARVIN G.
PAGE 3 OF 7

STORMWATER DETENTION BASIN "A"
DESIGN STORM 25 YEAR / 20 MINUTE

TOTAL ACRES OF DEVELOPMENT:

NORTH WATERSHED = 56.24 AC
EAST WATERSHED = 35.31 AC
TOTAL = 91.55 AC.

EXISTING CONDITIONS NORTH WATERSHED FLOW TO CREEK:

56.24 AC @ 2.31 = 129.91 CFS

POST DEVELOPMENT Q TO BASIN:

OFFSITE (0.71 + 2.49 + 2.13) = 5.33 AC @ 3.26 = 17.38 CFS
ONSITE = 14.55 AC @ 3.26 = 47.43 CFS
TOTAL = 19.88 AC = 64.81 CFS

BYPASS BASIN:

ONSITE DEVELOPED = 21.79 AC @ 3.26 = 71.04 CFS
ONSITE REC. AREA = 1.06 AC @ 3.26 = 3.46 CFS
ONSITE COMMON GROUND = 19.17 AC @ 2.31 = 44.28 CFS
TOTAL = 42.02 AC = 118.78 CFS

DETENTION REQUIRED:

64.81 + 118.78 = 183.59 CFS − 129.91 CFS = 53.68 CFS
53.68 X 20 MIN. X 60 SEC/MIN. = 64,416 CU. FT. VOLUME

ALLOWABLE RELEASE FROM BASIN:

64.81 CFS − 53.68 CFS = 11.13 CFS

RECTANGULAR ORIFICE
8 in W X 16 in H ELEV= 505

Outlet Pipe - 40 ft - 30 in pipe
UFL= 505 LFL= 504 n= .013

Overflow Structure - Standpipe
DIAM= 48 in STANDPIPE ELEV= 509.5

PROJECT NAME VILLAGES AT DARDENNE BATES VILLAGE

PROJECT #/JOB ORDER # 95-080 / 34202

DATE 4-22-96

DESIGNER TANYA D. / MARVIN G.

PAGE 4 OF 7

25 YEAR / 20 MIN.

VILLAGES AT DARDENNE-BATES VILLAGE 4-19-96 SUBMITTAL DATE: 4-22-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	194.45	194.45	0.00	194.45	505.04
2	388.90	583.35	0.85	582.50	505.12
3	583.35	1165.85	4.39	1161.46	505.24
4	777.80	1939.26	12.36	1926.90	505.40
5	972.25	2899.15	26.41	2872.74	505.60
6	1166.70	4039.44	48.08	3991.36	505.83
7	1361.15	5352.51	78.73	5273.78	506.03
8	1555.60	6829.38	108.93	6720.45	506.13
9	1750.05	8470.50	124.63	8345.87	506.24
10	1944.50	10290.37	143.09	10147.28	506.36
11	2138.95	12286.23	217.02	12069.21	506.49
12	2333.40	14402.61	236.37	14166.24	506.63
13	2527.85	16694.09	255.81	16438.28	506.78
14	2722.30	19160.58	275.33	18885.25	506.94
15	2916.75	21802.00	294.90	21507.10	507.12
16	3111.20	24618.30	314.54	24303.76	507.31
17	3305.65	27609.41	334.21	27275.21	507.50
18	3500.10	30775.31	353.91	30421.40	507.71
19	3694.55	34115.95	373.64	33742.31	507.94
20	3889.00	37631.31	393.40	37237.91	508.11
21	3694.55	40932.46	407.99	40524.47	508.25
22	3500.10	44024.57	419.50	43605.07	508.38
23	3305.65	46910.72	430.01	46480.71	508.50
24	3111.20	49591.91	439.59	49152.32	508.62
25	2916.75	52069.07	448.31	51620.76	508.72
26	2722.30	54343.06	456.22	53886.85	508.82
27	2527.85	56414.71	463.36	55951.35	508.90
28	2333.40	58284.75	469.77	57814.98	508.98
29	2138.95	59953.93	475.49	59478.45	509.05
30	1944.50	61422.95	480.53	60942.42	509.12
31	1750.05	62692.47	484.92	62207.55	509.17
32	1555.60	63763.15	488.69	63274.47	509.22
33	1361.15	64635.62	491.84	64143.78	509.25
34	1166.70	65310.48	494.40	64816.09	509.28
35	972.25	65788.35	496.36	65291.99	509.30
36	777.80	66069.79	497.75	65572.04	509.31
37	583.35	66155.40	498.56	65656.83	509.32
38	388.90	66045.73	498.81	65546.93	509.31
39	194.45	65741.38	498.49	65242.89	509.30
40	0.00	65242.89	497.61	64745.29	509.28

PEAK OUTFLOW= 8.310001 CFS AT 38 MINUTES

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DATE 4-22-96
DESIGNER TANYA D. / MARVIN G.
PAGE 5 OF 7

STORMWATER DETENTION BASIN "A"
DESIGN STORM 100 YEAR / 20 MINUTE

TOTAL ACRES OF DEVELOPMENT:

NORTH WATERSHED = 56.24 AC
EAST WATERSHED = 35.31 AC
TOTAL = 91.55 AC.

EXISTING CONDITIONS NORTH WATERSHED FLOW TO CREEK:

56.24 Ac @ 2.95 = 165.91 CFS

POST DEVELOPMENT Q TO BASIN:

OFFSITE (0.71+2.49+2.13)	= 5.33 AC @	4.17	= 22.23 CFS
ONSITE	= 14.55 AC @	4.17	= 60.67 CFS
TOTAL = 19.88 AC			= 82.90 CFS

BYPASS BASIN:

ONSITE DEVELOPED	= 21.79 AC @	4.17	= 90.86 CFS
ONSITE REC. AREA	= 1.06 AC @	4.17	= 4.42 CFS
ONSITE COMMON GROUND	= 19.17 AC @	2.95	= 56.55 CFS
TOTAL = 42.02 AC			= 151.83 CFS

DETENTION REQUIRED:

82.90 + 151.83 = 234.73 CFS - 165.91 CFS = 68.82 CFS
68.82 X 20 MIN. X 60 SEC/MIN. = 82,584 CU.FT. VOLUME

ALLOWABLE RELEASE FROM BASIN:

82.90 CFS - 68.82 CFS = 14.08 CFS

RECTANGULAR ORIFICE
8 in W X 16 in H ELEV= 505

Outlet Pipe - 40 ft - 30 in pipe
UFL= 505 LFL= 504 n= .013

Overflow Structure - Standpipe
DIAM= 48 in STANDPIPE ELEV= 509.5

PROJECT NAME VILLAGES AT DARDENNE BATES VILLAGE

PROJECT #/JOB ORDER # 95-080 / 34202

DATE 4-22-96

DESIGNER TANYA D. / MARVIN G.

PAGE 6 OF 7

100 YEAR / 20 MIN.

VILLAGES AT DARDENNE-BATES VILLAGE 4-19-96 SUBMITTAL DATE: 4-22-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	248.70	248.70	0.00	248.70	505.05
2	497.40	746.10	1.22	744.88	505.16
3	746.10	1490.98	6.35	1484.63	505.31
4	994.80	2479.43	17.86	2461.57	505.51
5	1243.50	3705.07	38.13	3666.94	505.76
6	1492.20	5159.14	69.33	5089.80	506.02
7	1740.90	6830.70	106.99	6723.71	506.13
8	1989.60	8713.31	124.67	8588.64	506.25
9	2238.30	10826.94	145.92	10681.02	506.39
10	2487.00	13168.02	222.56	12945.46	506.54
11	2735.70	15681.16	244.68	15436.48	506.71
12	2984.40	18420.88	266.89	18153.99	506.89
13	3233.10	21387.09	289.19	21097.90	507.09
14	3481.80	24579.70	311.55	24268.15	507.30
15	3730.50	27998.65	333.96	27664.69	507.53
16	3979.20	31643.89	356.41	31287.48	507.77
17	4227.90	35515.38	378.89	35136.49	508.02
18	4476.60	39613.09	400.46	39212.63	508.19
19	4725.30	43937.93	414.94	43522.99	508.38
20	4974.00	48496.99	429.73	48067.26	508.57
21	4725.30	52792.56	444.79	52347.78	508.75
22	4476.60	56824.38	458.52	56365.86	508.92
23	4227.90	60593.76	471.05	60122.71	509.08
24	3979.20	64101.91	482.47	63619.44	509.23
25	3730.50	67349.94	492.86	66857.08	509.37
26	3481.80	70338.88	502.28	69836.60	509.49
27	3233.10	73069.71	510.81	72558.90	509.61
28	2984.40	75543.29	593.68	74949.61	509.71
29	2735.70	77685.31	728.74	76956.58	509.80
30	2487.00	79443.58	873.20	78570.38	509.87
31	2238.30	80808.68	1008.75	79799.94	509.92
32	1989.60	81789.54	1117.11	80672.43	509.96
33	1740.90	82413.32	1211.31	81202.01	509.98
34	1492.20	82694.21	1263.10	81431.11	509.99
35	1243.50	82674.61	1285.85	81388.75	509.99
36	994.80	82383.55	1281.63	81101.93	509.97
37	746.10	81848.03	1253.25	80594.78	509.95
38	497.40	81092.18	1203.83	79888.35	509.92
39	248.70	80137.06	1125.16	79011.90	509.88
40	0.00	79011.90	1046.85	77965.05	509.84

PEAK OUTFLOW= 21.43 CFS AT 35 MINUTES

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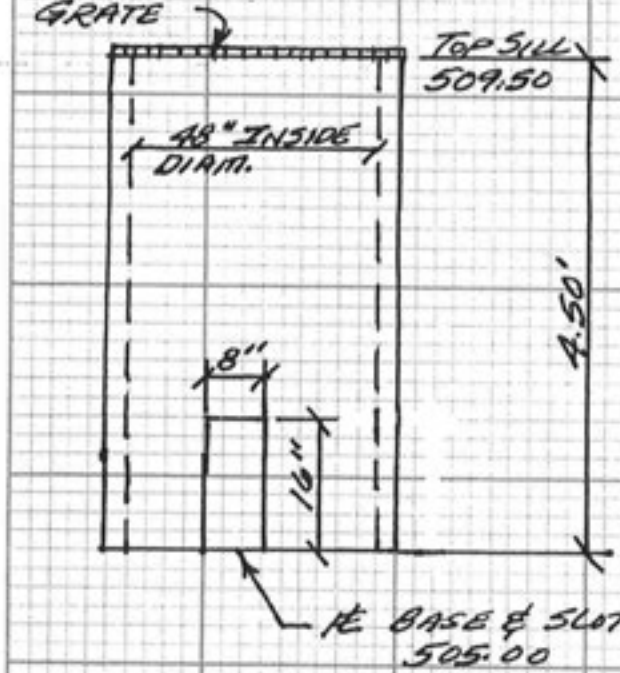
BASIN STORAGE:

VILLAGES AT DARDENNE-BATES VILLAGE 4-19-96 SUBMITTAL DATE: 4-22-96

ELEVATION	AREA	VOLUME	CUM. VOLUME
505.00	0		
		4805	4805
506.00	9610		
		29876	34681
508.00	20266		
		47042	81723
510.00	26776		

OVERFLOW STRUCTURE: (48" INSIDE DIAM. STANDPIPE WITH GRATE ON TOP



CHECK LOW FLOW BLOCKED
WIER EQUATION: 25 YEAR/20 MIN.

$Q = C L H^{3/2}$

$64.81 = (3.0)(12.57)(H^{3/2})$

$64.81 = (37.71)(H^{3/2})$

$\frac{64.81}{37.71} = H^{3/2}$

$1.719 = H^{3/2}$

$1.719^{2/3} = H$

$1.43' = H$

(509.32 H.W. + 1.43 = 510.45 ELEV.)

DAM ELEVATION:

100 YEAR H.W. ELEV. = 509.99
TOP DAM ELEV. = 511.00 (1.01' FREEBOARD)