

APPROVED

CK 2/27/97

Revised: 2-24-97 J.L.K.

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 11-17-96  
DESIGNER J. Kendrick  
PAGE 1 of 11

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

Detention has been accounted for the comm tract off Hwy K.

**BASIN @ LOT B  
STORMWATER DETENTION  
DESIGN STORM: 2 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 43.55 AC. x 1.20 CFS/AC.  
OFFSITE: 18.27 AC. x 1.20 CFS/AC.

Q = 52.26 CFS  
Q = 21.92 CFS  
TQ = 74.18 CFS

POST DEVELOPED Q TO BASIN:

ONSITE: 15.46 AC. x 1.67 CFS/AC.  
7.06 AC. x 2.47 CFS/AC. (COMM.)  
10.67 AC. x 1.20 CFS/AC.  
0.38 AC. x 1.20 CFS/AC.

Q = 25.82 CFS  
Q = 17.44 CFS  
Q = 12.80 CFS  
Q = 0.46 CFS  
TQ = 56.52 CFS

BYPASS BASIN -

POST-DEVELOPED:

ONSITE: 22.92 AC. x 1.67 CFS/AC.  
1.99 AC. x 1.20 CFS/AC.

Q = 38.39 CFS  
Q = 2.39 CFS

OFFSITE: 5.23 AC. x 1.20 CFS/AC.

Q = 6.28 CFS  
TQ = 47.06 CFS

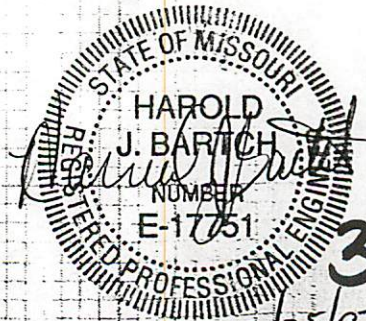
DETENTION REQUIRED:

$56.52 \text{ CFS} + 47.06 \text{ CFS} = 103.58 \text{ CFS} - 74.18 \text{ CFS} = 29.40 \text{ CFS}$   
 $29.40 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 52,920 \text{ CU.FT. (VOLUME)}$

ALLOWABLE RELEASE FROM BASIN:

$56.52 \text{ CFS} - 29.40 \text{ CFS} = 27.12 \text{ CFS}$

PEAK OUTFLOW = 7.78 CFS @ 11 MIN.



34

2/25/97



# PICKETT RAY & SILVER

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

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*2 YR. / 20 MIN.*

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*****
*
* RECTANGULAR ORIFICE
* 14 in W X 28 in H ELEV= 554
*
* Outlet Pipe - 33 ft - 54 in pipe
* UFL= 554 LFL= 553.83 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 72 in STANDPIPE ELEV= 562.8
*
*****
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HUTCHINGS FARM LOT 8                      2-24-97                      SUBMITTAL DATE: REVISED 2-24-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	169.56	169.56	0.00	169.56	554.04
2	339.12	508.68	1.38	507.30	554.12
3	508.68	1015.98	7.13	1008.85	554.23
4	678.24	1687.09	19.99	1667.10	554.38
5	847.80	2514.90	42.47	2472.43	554.56
6	1017.36	3489.79	76.72	3413.07	554.78
7	1186.92	4599.99	124.43	4475.56	555.02
8	1356.48	5832.04	186.84	5645.20	555.28
9	1526.04	7171.24	264.67	6906.57	555.57
10	1695.60	8602.17	358.16	8244.01	555.87
11	1865.16	10109.17	467.09	9642.08	556.08
PIPE CONTROL BEGINS					
12	2034.72	11676.80	168.49	11508.31	556.26
PIPE CONTROL ENDS					
13	2204.28	13712.59	617.95	13094.64	556.41
14	2373.84	15468.48	891.70	14576.78	556.55
15	2543.40	17120.18	941.07	16179.11	556.71
16	2712.96	18892.07	991.68	17900.39	556.87
17	2882.52	20782.91	1043.32	19739.59	557.05
18	3052.08	22791.67	1095.81	21695.86	557.23
19	3221.64	24917.50	1149.02	23768.48	557.43
20	3391.20	27159.68	1202.81	25956.87	557.64
21	3221.64	29178.51	1257.12	27921.39	557.83
22	3052.08	30973.47	1303.95	29669.52	557.99
23	2882.52	32552.04	1344.25	31207.79	558.11
24	2712.96	33920.75	1371.66	32549.09	558.21
25	2543.40	35092.49	1394.82	33697.67	558.30
26	2373.84	36071.51	1414.36	34657.15	558.37
27	2204.28	36861.43	1430.48	35430.95	558.43
28	2034.72	37465.67	1443.35	36022.32	558.47
29	1865.16	37887.48	1453.10	36434.38	558.50
30	1695.60	38129.98	1459.87	36670.11	558.52
31	1526.04	38196.15	1463.71	36732.44	558.52
32	1356.48	38088.92	1464.74	36624.18	558.51
33	1186.92	37811.10	1462.96	36348.14	558.49
34	1017.36	37365.50	1458.45	35907.05	558.46
35	847.80	36754.85	1451.21	35303.64	558.42
36	678.24	35981.88	1441.24	34540.64	558.36
37	508.68	35049.32	1428.53	33620.79	558.29
38	339.12	33959.91	1413.07	32546.85	558.21
39	169.56	32716.41	1394.79	31321.62	558.12
40	0.00	31321.62	1373.64	29947.98	558.02

PEAK OUTFLOW= 7.78 CFS AT 11 MINUTES

*24.4 cfs @ 27 min*

**BASIN @ LOT B**  
**STORMWATER DETENTION**  
**DESIGN STORM: 5 YR/20 MIN.**

**PRE-DEVELOPED CONDITIONS:**  
 OUSITE: 435 AC X 1.51 CFS/AC.  
 DESITE: 1827 AC X 1.51 CFS/AC.  
 TR = 93.35 CFS  
 Q = 6576 CFS  
 Q = 2739 CFS

**PST DEVELOPED @ TO BASIN:**  
 OUSITE: 154 AC X 2.12 CFS/AC.  
 7.06 AC X 3.11 CFS/AC (COMM.)  
 10.67 AC X 1.51 CFS/AC  
 0.38 AC X 1.51 CFS/AC  
 TR = 71.42 CFS  
 Q = 3278 CFS  
 Q = 2196 CFS  
 Q = 1611 CFS  
 Q = 0.57 CFS

**BYPASS BASIN -  
 PST-DEVELOPED:**  
 OUSITE: 229 AC X 2.12 CFS/AC.  
 1.99 AC X 1.51 CFS/AC.  
 DESITE: 523 AC X 1.51 CFS/AC.  
 TR = 5964 CFS  
 Q = 290 CFS  
 Q = 300 CFS  
 Q = 4874 CFS

**DETENTION REQUIRED:**  
 $71.42 \text{ CFS} + 5964 \text{ CFS} = 131.06 \text{ CFS} - 93.35 \text{ CFS} = 37.71 \text{ CFS}$   
 $37.71 \text{ CFS} \times 30 \text{ MIN} \times 60 \text{ SEC/MIN} = 67,878 \text{ CU.FT. (VOLUME)}$   
**ALLOWABLE RELEASE FROM BASIN:**  
 71.42 CFS - 37.71 CFS = 33.71 CFS  
**PEAK OUTFLOW = 2745 CFS @ 33 MIN.**



PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

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# PICKETT RAY & SILVER

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

*5 YR./20 MIN.*

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*****
*
* RECTANGULAR ORIFICE
* 14 in W X 28 in H ELEV= 554
*
* Outlet Pipe - 33 ft - 54 in pipe
* UFL= 554 LFL= 553.83 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 72 in STANDPIPE ELEV= 562.8
*
*****

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HUTCHINGS FARM LOT 8      2-24-97      SUBMITTAL DATE: REVISED 2-24-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	214.26	214.26	0.00	214.26	554.05
2	428.52	642.78	1.96	640.82	554.15
3	642.78	1283.60	10.12	1273.48	554.29
4	857.04	2130.52	28.36	2102.16	554.48
5	1071.30	3173.46	60.14	3113.32	554.71
6	1285.56	4398.88	108.40	4290.48	554.98
7	1499.82	5790.30	175.36	5614.94	555.28
8	1714.08	7329.02	262.56	7066.46	555.61
9	1928.34	8994.80	370.68	8624.12	555.96
10	2142.60	10766.72	499.77	10266.95	556.14
11	2356.86	12623.81	569.94	12053.87	556.31
12	2571.12	14624.99	639.44	13985.55	556.50
13	2785.38	16770.93	921.69	15849.24	556.67
14	2999.64	18848.88	981.48	17867.40	556.87
15	3213.90	21081.30	1042.36	20038.94	557.07
16	3428.16	23467.10	1104.11	22362.99	557.30
17	3642.42	26005.41	1166.59	24838.82	557.53
18	3856.68	28695.50	1229.67	27465.83	557.78
19	4070.94	31536.77	1293.24	30243.53	558.04
20	4285.20	34528.73	1354.76	33173.97	558.26
21	4070.94	37244.91	1405.49	35839.42	558.46
22	3856.68	39696.10	1450.09	38246.01	558.64
23	3642.42	41888.43	1489.21	40399.22	558.80
24	3428.16	43827.38	1523.37	42304.01	558.94
25	3213.90	45517.91	1552.96	43964.96	559.06
26	2999.64	46964.60	1577.23	45387.37	559.16
27	2785.38	48172.75	1596.84	46575.92	559.24
28	2571.12	49147.04	1613.04	47534.00	559.30
29	2356.86	49890.86	1625.99	48264.87	559.35
30	2142.60	50407.47	1635.80	48771.67	559.39
31	1928.34	50700.01	1642.56	49057.46	559.41
32	1714.08	50771.54	1646.37	49125.17	559.41
33	1499.82	50624.99	1647.27	48977.72	559.40
34	1285.56	50263.28	1645.30	48617.98	559.38
35	1071.30	49689.28	1640.52	48048.77	559.34
36	857.04	48905.81	1632.90	47272.91	559.28
37	642.78	47915.69	1622.47	46293.22	559.22
38	428.52	46721.74	1609.20	45112.54	559.14
39	214.26	45326.80	1593.07	43733.73	559.04
40	0.00	43733.73	1574.02	42159.71	558.93

PEAK OUTFLOW= 27.45 CFS AT 33 MINUTES

**PICKETT RAY & SILVER**

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397-1211

PROJECT NAME Hutchings Farm  
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DATE 10-16-96  
DESIGNER V. Kendrick  
PAGE 5 of 11

**BASIN @ LOT 8  
STORMWATER DETENTION  
DESIGN STORM: 15YR./20MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 43.55 AC. x 1.87 CFS/AC.

Q = 81.44 CFS

OFFSITE: 18.27 AC. x 1.87 CFS/AC.

Q = 34.16 CFS

TQ = 115.60 CFS

POST-DEVELOPED Q TO BASIN:

ONSITE: 15.46 AC. x 2.64 CFS/AC.

Q = 40.81 CFS

7.06 AC. x 3.85 CFS/AC. (COMM)

Q = 27.18 CFS

10.67 AC. x 1.87 CFS/AC.

Q = 19.95 CFS

0.38 AC. x 1.87 CFS/AC.

Q = 0.71 CFS

TQ = 88.65 CFS

BYPASS BASIN -

POST DEVELOPED:

ONSITE: 22.99 AC. x 2.64 CFS/AC.

Q = 60.69 CFS

1.99 AC. x 1.87 CFS/AC.

Q = 3.72 CFS

OFFSITE: 5.23 AC. x 1.87 CFS/AC.

Q = 9.78 CFS

TQ = 74.19 CFS

DETENTION REQUIRED:

$88.65 \text{ CFS} + 74.19 \text{ CFS} = 162.84 \text{ CFS} - 115.60 \text{ CFS} = 47.24 \text{ CFS}$

$47.24 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 85,032 \text{ CU. FT.}$

(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$88.65 \text{ CFS} - 47.24 \text{ CFS} = 41.41 \text{ CFS}$

PEAK OUTFLOW = 30.64 CFS @ 34 MIN.

# PICKETT RAY & SILVER

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St. Peters, MD 63376

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Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # \_\_\_\_\_

*95-234*

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

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*15 YR. / 20 MIN.*

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*
* RECTANGULAR ORIFICE
* 14 in W X 28 in H ELEV= 554
*
* Outlet Pipe - 33 ft - 54 in pipe
* UFL= 554 LFL= 553.83 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 72 in STANDPIPE ELEV= 562.8
*
*****
    
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HUTCHINGS FARM LOT 8      2-24-97      SUBMITTAL DATE: REVISED 2-24-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	265.95	265.95	0.00	265.95	554.06
2	531.90	797.85	2.71	795.14	554.18
3	797.85	1592.99	13.99	1579.00	554.36
4	1063.80	2642.80	39.15	2603.65	554.59
5	1329.75	3933.40	82.90	3850.50	554.88
6	1595.70	5446.20	149.09	5297.11	555.20
7	1861.65	7158.76	240.56	6918.20	555.57
8	2127.60	9045.80	359.08	8686.72	555.98
9	2393.55	11080.27	505.21	10575.06	556.17
10	2659.50	13234.56	581.73	12652.83	556.37
11	2925.45	15578.28	876.45	14701.83	556.56
12	3191.40	17893.23	945.12	16948.11	556.78
13	3457.35	20405.46	1015.07	19390.39	557.01
14	3723.30	23113.69	1086.03	22027.66	557.26
15	3989.25	26016.91	1157.80	24859.11	557.53
16	4255.20	29114.31	1230.18	27884.13	557.82
17	4521.15	32405.28	1303.07	31102.21	558.10
18	4787.10	35889.31	1369.81	34519.50	558.36
19	5053.05	39572.55	1428.17	38144.38	558.63
20	5319.00	43463.38	1487.59	41975.79	558.91
21	5053.05	47028.84	1547.90	45480.94	559.16
22	4787.10	50268.04	1598.12	48669.92	559.38
23	4521.15	53191.07	1641.21	51549.87	559.58
24	4255.20	55805.07	1679.16	54125.91	559.75
25	3989.25	58115.16	1712.40	56402.76	559.91
26	3723.30	60126.06	1741.25	58384.81	560.05
27	3457.35	61842.16	1765.99	60076.18	560.16
28	3191.40	63267.58	1786.82	61480.76	560.26
29	2925.45	64406.21	1803.93	62602.28	560.33
30	2659.50	65261.78	1817.49	63444.29	560.39
31	2393.55	65837.85	1827.60	64010.23	560.43
32	2127.60	66137.83	1834.36	64303.47	560.45
33	1861.65	66165.12	1837.86	64327.26	560.45
34	1595.70	65922.96	1838.14	64084.82	560.44
35	1329.75	65414.57	1835.25	63579.32	560.40
36	1063.80	64643.12	1829.22	62813.91	560.35
37	797.85	63611.76	1820.03	61791.73	560.28
38	531.90	62323.63	1807.70	60515.93	560.19
39	265.95	60781.88	1792.19	58989.69	560.09
40	0.00	58989.69	1773.46	57216.23	559.97

PEAK OUTFLOW= 30.64 CFS AT 34 MINUTES

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER J. Kendrick  
PAGE 7 of 11.

**BASIN @ LOT 8  
STORMWATER DETENTION  
DESIGN STORM: 25YR./20MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 43.55 AC. x 2.31 CFS/AC.  
18.27 AC. x 2.31 CFS/AC

$Q = 100.60 \text{ CFS}$

$Q = 42.20 \text{ CFS}$

$TQ = 142.80 \text{ CFS}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 15.46 AC. x 3.26 CFS/AC.  
7.06 AC. x 4.75 CFS/AC. (COMM)  
10.67 AC. x 2.31 CFS/AC.  
0.38 AC. x 2.31 CFS/AC.

$Q = 50.40 \text{ CFS}$

$Q = 33.54 \text{ CFS}$

$Q = 24.65 \text{ CFS}$

$Q = 0.88 \text{ CFS}$

$TQ = 109.47 \text{ CFS}$

BYPASS BASIN -  
POST-DEVELOPED:

ONSITE: 22.99 AC. x 3.26 CFS/AC.  
1.99 AC. x 2.31 CFS/AC.

$Q = 74.95 \text{ CFS}$

$Q = 4.60 \text{ CFS}$

OFFSITE: 5.23 AC. x 2.31 CFS/AC.

$Q = 12.08 \text{ CFS}$

$TQ = 91.63 \text{ CFS}$

DETENTION REQUIRED:

$109.47 \text{ CFS} + 91.63 \text{ CFS} = 201.10 \text{ CFS} - 142.80 \text{ CFS} = 58.30 \text{ CFS}$

$58.30 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 104,940 \text{ CU. FT.}$   
(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$109.47 \text{ CFS} - 58.30 \text{ CFS} = 51.17 \text{ CFS}$

PEAK OUTFLOW = 34.20 CFS @ 34 MIN.



# PICKETT RAY & SILVER

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St. Peters, MD 63376

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Planners  
Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

PAGE 8 of 11.

*25 YR./20 MIN.*

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*****
*
* RECTANGULAR ORIFICE
* 14 in W X 28 in H ELEV= 554
*
* Outlet Pipe - 33 ft - 54 in pipe
* UFL= 554 LFL= 553.83 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 72 in STANDPIPE ELEV= 562.8
*
*****
```

HUTCHINGS FARM LOT 8                      2-24-97                      SUBMITTAL DATE: REVISED 2-24-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	328.41	328.41	0.00	328.41	554.07
2	656.82	985.23	3.71	981.52	554.22
3	985.23	1966.75	19.18	1947.57	554.44
4	1313.64	3261.21	53.63	3207.58	554.73
5	1642.05	4849.63	113.35	4736.28	555.08
6	1970.46	6706.74	203.39	6503.35	555.48
7	2298.87	8802.22	327.26	8474.96	555.93
8	2627.28	11102.24	486.85	10615.39	556.17
9	2955.69	13571.08	583.30	12987.78	556.40
10	3284.10	16271.88	888.04	15383.84	556.63
11	3612.51	18996.35	966.90	18029.45	556.88
12	3940.92	21970.37	1047.09	20923.28	557.16
13	4269.33	25192.61	1128.30	24064.31	557.46
14	4597.74	28662.05	1210.29	27451.76	557.78
15	4926.15	32377.91	1292.91	31085.00	558.10
16	5254.56	36339.56	1369.51	34970.05	558.39
17	5582.97	40553.02	1435.69	39117.33	558.70
18	5911.38	45028.71	1503.13	43525.58	559.03
19	6239.79	49765.37	1571.12	48194.25	559.35
20	6568.20	54762.45	1634.85	53127.60	559.69
21	6239.79	59367.39	1699.60	57667.79	560.00
22	5911.38	63579.17	1757.08	61822.09	560.28
23	5582.97	67405.06	1808.07	65597.00	560.54
24	5254.56	70851.56	1853.19	68998.36	560.77
25	4926.15	73924.51	1892.93	72031.58	560.98
26	4597.74	76629.32	1927.67	74701.65	561.16
27	4269.33	78970.97	1957.74	77013.23	561.32
28	3940.92	80954.15	1983.41	78970.75	561.45
29	3612.51	82583.25	2004.90	80578.35	561.56
30	3284.10	83862.46	2022.37	81840.10	561.65
31	2955.69	84795.78	2035.97	82759.81	561.71
32	2627.28	85387.10	2045.83	83341.28	561.75
33	2298.87	85640.14	2052.04	83588.10	561.77
34	1970.46	85558.56	2054.67	83503.90	561.76
35	1642.05	85145.94	2053.77	83092.18	561.74
36	1313.64	84405.82	2049.38	82356.43	561.69
37	985.23	83341.66	2041.51	81300.15	561.61
38	656.82	81956.96	2030.16	79926.81	561.52
39	328.41	80255.22	2015.30	78239.93	561.40
40	0.00	78239.93	1996.90	76243.03	561.27

PEAK OUTFLOW= 34.24 CFS AT 34 MINUTES



**PICKETT RAY & SILVER**

333 Mid Rivers Mall Dr.  
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Civil Engineers  
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397-1211

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER J. Kendrick  
PAGE 9 of 11.

**BASIN @ LOT 8  
STORMWATER DETENTION  
DESIGN STORM: 100YR./20MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 43.55 AC. x 2.95 CFS/AC.  
OFFSITE: 18.27 AC. x 2.95 CFS/AC.

Q = 128.47 CFS  
Q = 53.90 CFS

TQ = 182.37 CFS

POST-DEVELOPED Q TO BASIN:

ONSITE: 15.46 AC. x 4.17 CFS/AC.  
7.06 AC. x 6.08 CFS/AC. (COMM.)  
10.67 AC. x 2.95 CFS/AC.  
0.38 AC. x 2.95 CFS/AC.

Q = 64.47 CFS  
Q = 42.92 CFS  
Q = 31.48 CFS  
Q = 1.12 CFS

TQ = 139.99 CFS

BYPASS BASIN -  
POST-DEVELOPED:

ONSITE: 22.99 AC. x 4.17 CFS/AC.  
1.99 AC. x 2.95 CFS/AC.

Q = 96.87 CFS  
Q = 5.87 CFS

OFFSITE: 5.23 AC. x 2.95 CFS/AC.

Q = 15.43 CFS

TQ = 117.17 CFS

DETENTION REQUIRED:

$139.99 \text{ CFS} + 117.17 \text{ CFS} = 257.16 \text{ CFS} - 182.37 \text{ CFS} = 74.79 \text{ CFS}$

$74.79 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 134,622 \text{ CU. FT.}$   
(VOLUME)

ALLOWABLE RELEASE:

$139.99 \text{ CFS} - 74.79 \text{ CFS} = 65.20 \text{ CFS}$

PEAK OUTFLOW = 61.52 CFS @ 32 MIN.



# PICKETT RAY & SILVER

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

PAGE 10 of 11.

*100 YR. / 20 MIN.*

```

*
* RECTANGULAR ORIFICE
* 14 in W x 28 in H ELEV= 554
*
* Outlet Pipe - 33 ft - 54 in pipe
* UFL= 554 LFL= 553.83 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 72 in STANDPIPE ELEV= 562.8
*
*****
  
```

HUTCHINGS FARM LOT 8                      2-24-97                      SUBMITTAL DATE: REVISED 2-24-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	419.97	419.97	0.00	419.97	554.10
2	839.94	1259.91	5.37	1254.54	554.29
3	1259.91	2514.45	27.73	2486.72	554.57
4	1679.88	4166.60	77.38	4089.22	554.93
5	2099.85	6189.07	163.18	6025.89	555.37
6	2519.82	8545.71	291.88	8253.83	555.88
7	2939.79	11193.62	467.91	10725.71	556.18
8	3359.76	14085.47	587.53	13497.94	556.45
9	3779.73	17277.67	905.40	16372.27	556.72
10	4199.70	20571.97	997.61	19574.36	557.03
11	4619.67	24194.03	1091.19	23102.84	557.37
12	5039.64	28142.48	1185.80	26956.68	557.73
13	5459.61	32416.29	1281.16	31135.13	558.10
14	5879.58	37014.71	1370.39	35644.32	558.44
15	6299.55	41943.87	1446.87	40497.00	558.80
16	6719.52	47216.52	1524.90	45691.62	559.18
17	7139.49	52831.12	1601.01	51230.10	559.56
18	7559.46	58789.56	1674.99	57114.58	559.96
19	7979.43	65094.01	1750.17	63343.84	560.38
20	8399.40	71743.25	1826.40	69916.85	560.83
21	7979.43	77896.28	1903.52	75992.78	561.25
22	7559.46	83552.25	1972.13	81580.11	561.63
23	7139.49	88719.60	2033.17	86686.44	561.98
24	6719.52	93405.96	2087.40	91318.56	562.30
25	6299.55	97618.12	2135.41	95482.71	562.58
26	5879.58	101362.30	2177.66	99184.62	562.84
27	5459.61	104644.20	2237.24	102407.00	563.06
28	5039.64	107446.60	2263.87	104792.80	563.21
29	4619.67	109412.40	3105.23	106307.20	563.31
30	4199.70	110506.90	3458.85	107048.10	563.35
31	3779.73	110827.80	3661.72	107166.10	563.36
32	3359.76	110525.90	3691.06	106834.80	563.34
33	2939.79	109774.60	3583.87	106190.70	563.30
34	2519.82	108710.50	3431.67	105278.90	563.24
35	2099.85	107378.70	3207.60	104171.10	563.17
36	1679.88	105851.00	2979.64	102871.40	563.08
37	1259.91	104131.30	2731.99	101399.30	562.99
38	839.94	102239.20	2494.78	99744.44	562.88
39	419.97	100164.40	2284.58	97879.84	562.75
40	0.00	97879.84	2201.62	95678.24	562.60

PEAK OUTFLOW= 61.52 CFS AT 32 MINUTES

# PICKETT RAY & SILVER

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_  
PROJECT #/JOB ORDER # 95-234  
DATE \_\_\_\_\_  
DESIGNER \_\_\_\_\_  
PAGE 11 of 11.

ELEVATION	AREA	VOLUME	CUM. VOLUME
554.00	0		
556.00	8796	8796	8796
558.00	12148	20944	29740
559.00	14608	13378	43118
563.00	14608	58432	101550
564.00	16508	15558	117108
565.80	21118	33863	150971

CHECK LOWFLOW BLOCKED:  
WEIR EQUATION: (25 YR./20 MIN.)

$$Q_{25} = CLH^{3/2}$$

$$109.47 \text{ cfs} = (3.0)(18.85)H^{3/2}$$

$$109.47 \text{ cfs} = (56.55)H^{3/2}$$

$$\left(\frac{109.47}{56.55}\right)^{2/3} = H$$

$$1.55 = H$$

CHECK LOWFLOW BLOCKED:  
WEIR EQUATION: (100 YR./20 MIN.)

$$Q_{100} = CLH^{3/2}$$

$$139.99 \text{ cfs} = (3.0)(18.85)H^{3/2}$$

$$139.99 \text{ cfs} = (56.55)H^{3/2}$$

$$\left(\frac{139.99}{56.55}\right)^{2/3} = H$$

$$1.83 = H$$

$$\text{TOP DAM} = 565.80$$

$$\text{SILL ELEV.} = 562.80$$

$$\text{FREEBOARD} = \text{TOP DAM} - (\text{SILL ELEV.} + \text{WEIR})$$

$$\text{FREEBOARD}_{25} = 565.80 - (562.80 + 1.55)$$

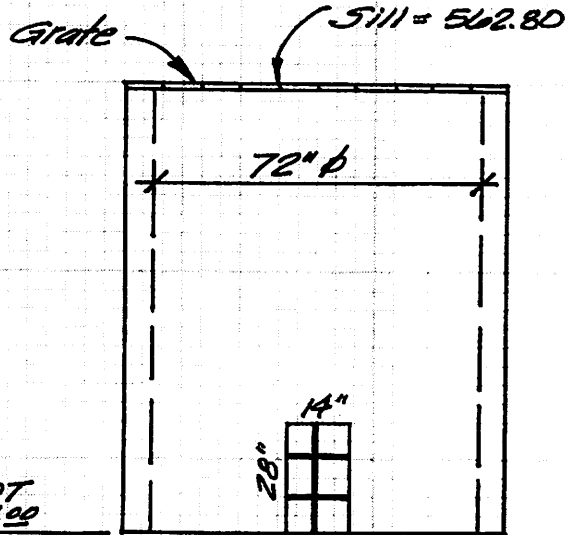
$$\text{FREEBOARD}_{25} = 565.80 - 564.35$$

$$\text{FREEBOARD}_{25} = 1.45'$$

$$\text{FREEBOARD}_{100} = 565.80 - (562.80 + 1.83)$$

$$\text{FREEBOARD}_{100} = 565.80 - 564.63$$

$$\text{FREEBOARD}_{100} = 1.17'$$



OUTFALL STRUCTURE  
O.S. #3

72"  $\phi$  standpipe  
w/ steel grate  
on sill.



APPROVED

OK  
CK

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 12-17-96  
DESIGNER J. Kendrick  
PAGE 1 of 11.

**PICKETT RAY & SILVER**

Civil Engineers  
Planners  
Land Surveyors

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

397-1211

**BASIN @ LOT 72  
STORM WATER DETENTION  
DESIGN STORM: 2 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 27.53 AC. x 1.20 CFS/AC.

$$Q = 33.04 \text{ CFS}$$

$$TQ = 33.04 \text{ CFS}$$

POST DEVELOPED Q TO BASIN:

ONSITE: 25.07 AC. x 1.67 CFS/AC.

$$Q = 41.87 \text{ CFS}$$

$$TQ = 41.87 \text{ CFS}$$

BYPASS BASIN -  
POST DEVELOPED:

ONSITE: 2.08 AC. x 1.67 CFS/AC.

$$Q = 3.47 \text{ CFS}$$

$$TQ = 3.47 \text{ CFS}$$

DETENTION REQUIRED:

$$41.87 \text{ CFS} + 3.47 \text{ CFS} = 45.34 \text{ CFS} - 33.04 \text{ CFS} = 12.30 \text{ CFS}$$

$$12.30 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 14,760 \text{ CU.FT. (VOLUME)}$$

ALLOWABLE RELEASE FROM BASIN:

$$41.87 \text{ CFS} - 12.30 \text{ CFS} = 29.57 \text{ CFS}$$

PEAK OUTFLOW = 27.1 CFS @ 28 MINUTES



# PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.  
St. Peters, MD 693376

Civil Engineers  
Planners  
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397-1211

PROJECT NAME Hutchings Farms  
 PROJECT #/JOB ORDER # 095-234/34869  
 DATE 12-17-96  
 DESIGNER J. Kendrick  
 PAGE 2 of 11.

\*\*\*\*\*  
 \*\* RECTANGULAR ORIFICE ELEV= 567 \*  
 \*\* 18 in W X 36 in H \*  
 \* Outlet Pipe - 36 ft - 42 in Pipe \*  
 \* UFL= 567 LFL= 566.5 n= .013 \*  
 \* \*  
 \* \* Overflow Structure - Standpipe \*  
 \* \* DIAM= 60 in STANDPIPE ELEV= 573 \*  
 \* \*  
 \*\*\*\*\*

HUTCHINGS FARMS

12-19-96

SUBMITTAL DATE: 12-20-96

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	125.61	125.61	0.00	125.61	567.03
2	251.22	376.83	0.99	375.84	567.08
3	376.83	752.67	5.12	747.55	567.16
4	502.44	1249.99	14.36	1235.63	567.26
5	628.05	1863.68	30.51	1833.17	567.38
6	753.66	2586.83	55.15	2531.68	567.53
7	879.27	3410.95	89.49	3321.46	567.69
8	1004.88	4326.34	134.48	4191.86	567.87
9	1130.49	5322.35	190.67	5131.68	568.03
10	1256.10	6387.78	244.42	6143.36	568.12
11	1381.71	7525.07	277.65	7247.42	568.22
12	1507.32	8754.74	315.48	8439.26	568.33
13	1632.93	10072.19	358.08	9714.11	568.44
14	1758.54	11472.65	405.59	11067.06	568.57
15	1884.15	12951.21	458.16	12493.05	568.69
16	2009.76	14502.81	515.80	13987.01	568.83
17	2135.37	16122.38	578.57	15543.81	568.97
18	2260.98	17804.79	646.52	17158.27	569.11
19	2386.59	19544.86	719.59	18825.27	569.27
20	2512.20	21337.47	797.70	20539.77	569.42
21	2386.59	22926.36	880.82	22045.54	569.56
22	2260.98	24306.98	956.03	23350.49	569.67
23	2135.37	25485.86	1022.85	24463.01	569.77
24	2009.76	26472.77	1081.01	25391.76	569.86
25	1884.15	27275.91	1130.37	26145.54	569.93
26	1758.54	27904.08	1170.95	26733.13	569.98
27	1632.93	28366.06	1202.94	27163.13	570.01
28	1507.32	28670.45	1626.12	27044.33	570.01
29	1381.71	28426.04	1621.59	26804.45	569.99
30	1256.10	28060.55	1206.82	26853.73	569.99
31	1130.49	27984.22	1209.52	26774.70	569.98
32	1004.88	27779.58	1205.19	26574.39	569.96
33	879.27	27453.66	1194.26	26259.40	569.94
34	753.66	27013.06	1177.11	25835.95	569.90
35	628.05	26464.00	1154.21	25309.79	569.85
36	502.44	25812.23	1125.99	24686.24	569.79
37	376.83	25063.07	1092.80	23970.27	569.73
38	251.22	24221.49	1055.10	23166.39	569.66
39	125.61	23292.00	1013.34	22278.66	569.58
40	0.00	22278.66	967.84	21310.83	569.49

PEAK OUTFLOW= 27.1 CFS AT 28 MINUTES

**PICKETT RAY & SILVER**

Civil Engineers  
Planners  
Land Surveyors

397-1211

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

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 12-17-96  
DESIGNER V. Kendrick  
PAGE 3 of 11

**BASIN @ LOT 72  
STORM WATER DETENTION  
DESIGN STORM: 5 YR./20MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 27.5AC. X 1.51 CFS/AC.

$Q = 41.57 \text{ CFS}$   
 $TQ = 41.57 \text{ CFS}$

POST DEVELOPED Q TO BASIN:

ONSITE: 25.07AC. X 2.12 CFS/AC.

$Q = 53.15 \text{ CFS}$   
 $TQ = 53.15 \text{ CFS}$

BYPASS BASIN -  
POST DEVELOPED:

ONSITE: 2.08AC. X 2.12 CFS/AC.

$Q = 4.41 \text{ CFS}$   
 $TQ = 4.41 \text{ CFS}$

DETENTION REQUIRED:

$53.15 \text{ CFS} + 4.41 \text{ CFS} = 57.56 \text{ CFS} - 41.57 \text{ CFS} = 15.99 \text{ CFS}$   
 $15.99 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 19,188 \text{ CU.FT.}$   
(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$53.15 \text{ CFS} - 15.99 \text{ CFS} = 37.16 \text{ CFS}$

PEAK OUTFLOW = 30.22 CFS @ 29 MINUTES

# PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.  
St. Peters, MO 63378

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME Hutchings Farm  
 PROJECT #/JOB ORDER # 95-234/34869  
 DATE 12-17-96  
 DESIGNER J. Kendrick  
 PAGE 4 of 11.

```

*****
*                               *
* RECTANGULAR ORIFICE          *
* 18 in W X 36 in H   ELEV= 567 *
*                               *
* Outlet Pipe - 36 ft - 42 in pipe *
* UFL= 567   LFL= 566.5   n= .013 *
*                               *
* Overflow Structure - Standpipe *
* DIAM= 60 in   STANDPIPE ELEV= 573 *
*                               *
*****
    
```

HUTCHINGS FARMS		12-19-96	SUBMITTAL DATE: 12-20-96		
MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	159.45	159.45	0.00	159.45	567.03
2	318.90	478.35	1.42	476.93	567.10
3	478.35	955.28	7.32	947.96	567.20
4	637.80	1585.76	20.50	1565.26	567.33
5	797.25	2362.51	43.50	2319.01	567.48
6	956.70	3275.71	78.45	3197.26	567.67
7	1116.15	4313.41	127.01	4186.40	567.87
8	1275.60	5462.00	190.30	5271.70	568.04
9	1435.05	6706.75	248.94	6457.81	568.15
10	1594.50	8052.31	288.24	7764.07	568.27
11	1753.95	9518.02	333.73	9184.29	568.40
12	1913.40	11097.69	385.61	10712.08	568.53
13	2072.85	12784.93	444.16	12340.77	568.68
14	2232.30	14573.07	509.54	14063.53	568.84
15	2391.75	16455.28	581.87	15873.41	569.00
16	2551.20	18424.61	661.22	17763.40	569.17
17	2710.65	20474.05	747.62	19726.43	569.35
18	2870.10	22596.53	841.03	21755.50	569.53
19	3029.55	24785.05	941.38	23843.68	569.72
20	3189.00	27032.68	1048.49	25984.19	569.91
21	3029.55	29013.74	1162.24	27851.50	570.06
22	2870.10	30721.60	1652.14	29069.46	570.15
23	2710.65	31780.11	1697.18	30082.93	570.22
24	2551.20	32634.13	1733.76	30900.37	570.28
25	2391.75	33292.12	1762.70	31529.42	570.32
26	2232.30	33761.72	1784.67	31977.05	570.36
27	2072.85	34049.90	1800.14	32249.76	570.37
28	1913.40	34163.16	1809.50	32353.66	570.38
29	1753.95	34107.61	1813.06	32294.54	570.38
30	1594.50	33889.04	1811.03	32078.01	570.36
31	1435.05	33513.06	1803.60	31709.46	570.34
32	1275.60	32985.06	1790.91	31194.16	570.30
33	1116.15	32310.31	1773.02	30537.30	570.25
34	956.70	31494.00	1749.92	29744.08	570.20
35	797.25	30541.33	1721.60	28819.73	570.13
36	637.80	29457.53	1688.05	27769.48	570.06
37	478.35	28247.83	1649.07	26598.76	569.97
38	318.90	26917.66	1195.59	25722.08	569.89
39	159.45	25881.53	1148.09	24733.45	569.80
40	0.00	24733.45	1095.31	23638.14	569.70

PEAK OUTFLOW= 30.22 CFS AT 29 MINUTES

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME Hutchings Farms  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER V. Kendrick / T. Dietz  
PAGE 5 of 11

**BASIN @ LOT 72  
STORMWATER DETENTION  
DESIGN STORM / 15 YR. / 20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 27.53 AC. x 1.87 CFS/AC.

$$Q = 51.48 \text{ CFS}$$
$$TQ = 51.48 \text{ CFS}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 25.07 AC. x 2.64 CFS/AC.

$$Q = 66.18 \text{ CFS}$$
$$TQ = 66.18 \text{ CFS}$$

BYPASS BASIN-  
POST-DEVELOPED:

ONSITE: 2.08 AC. x 2.64 CFS/AC.

$$Q = 5.49 \text{ CFS}$$
$$TQ = 5.49 \text{ CFS}$$

DETENTION REQUIRED:

$$66.18 \text{ CFS} + 5.49 \text{ CFS} = 71.67 \text{ CFS} - 51.48 \text{ CFS} = 20.19 \text{ CFS}$$
$$20.19 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 24,228 \text{ CU.FT.}$$

(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$$66.18 \text{ CFS} - 20.19 \text{ CFS} = 45.99 \text{ CFS}$$

PEAK OUTFLOW = 34.57 CFS @ 30 MINUTES



PROJECT NAME Hutchings Farms  
 PROJECT #/JOB ORDER # 95-234/34869  
 DATE 10-16-96  
 DESIGNER V. Kendrick / T. Dietz.  
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**PICKETT RAY & SILVER**

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

Civil Engineers  
 Planners  
 Land Surveyors 397-1211

\*\*\*\*\*  
 \* RECTANGULAR ORIFICE \*  
 \* 18 in W X 36 in H ELEV= 567 \*  
 \* \*  
 \* Outlet Pipe - 36 ft - 42 in pipe \*  
 \* UFL= 567 LFL= 566.5 n= .013 \*  
 \* \*  
 \* Overflow Structure - Standpipe \*  
 \* DIAM= 60 in STANDPIPE ELEV= 573 \*  
 \* \*  
 \*\*\*\*\*

HUTCHINGS FARM 10-16-96 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	198.54	198.54	0.00	198.54	567.04
2	397.08	595.62	1.97	593.65	567.12
3	595.62	1189.27	10.16	1179.11	567.25
4	794.16	1973.27	28.45	1944.82	567.40
5	992.70	2937.52	60.25	2877.27	567.60
6	1191.24	4068.51	108.43	3960.08	567.82
7	1389.78	5349.86	175.08	5174.78	568.03
8	1588.32	6763.10	245.82	6517.28	568.15
9	1786.86	8304.14	290.27	8013.87	568.29
10	1985.40	9999.27	342.67	9656.60	568.44
11	2183.94	11840.54	403.40	11437.14	568.60
12	2382.48	13819.62	472.89	13346.73	568.77
13	2581.02	15927.75	551.38	15376.37	568.95
14	2779.56	18155.93	639.08	17516.85	569.15
15	2978.10	20494.95	736.16	19758.79	569.35
16	3176.64	22935.43	842.61	22092.83	569.56
17	3375.18	25468.01	958.43	24509.58	569.78
18	3573.72	28083.30	1083.47	26999.83	570.00
19	3772.26	30772.09	1619.91	29152.18	570.15
20	3970.80	33122.98	1700.20	31422.78	570.32
21	3772.26	35195.04	1780.97	33414.08	570.46
22	3573.72	36987.80	1848.91	35138.89	570.58
23	3375.18	38514.07	1905.82	36608.26	570.68
24	3176.64	39784.90	1952.98	37831.92	570.77
25	2978.10	40810.02	1991.39	38818.63	570.84
26	2779.56	41598.19	2021.84	39576.35	570.89
27	2581.02	42157.37	2044.91	40112.46	570.93
28	2382.48	42494.94	2061.09	40433.85	570.95
29	2183.94	42617.79	2070.72	40547.08	570.96
30	1985.40	42532.48	2074.11	40458.36	570.96
31	1786.86	42245.22	2071.46	40173.76	570.94
32	1588.32	41762.08	2062.93	39699.16	570.90
33	1389.78	41088.94	2048.64	39040.31	570.86
34	1191.24	40231.55	2028.63	38202.92	570.80
35	992.70	39195.62	2002.90	37192.72	570.72
36	794.16	37986.88	1971.40	36015.48	570.64
37	595.62	36611.10	1934.08	34677.02	570.55
38	397.08	35074.10	1890.73	33183.36	570.44
39	198.54	33381.90	1841.16	31540.74	570.32
40	0.00	31540.74	1785.06	29755.68	570.20

PEAK OUTFLOW= 34.57 CFS AT 30 MINUTES

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME Hutchings Farms  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER V. Kendrick / T. Dietz  
PAGE 7 of 11

**BASIN @ LOT 72  
STORMWATER DETENTION  
DESIGN STORM / 25 YR. / 20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 27.53 AC. x 2.31 CFS/AC.

$$Q = 63.59 \text{ CFS}$$
$$TQ = 63.59 \text{ CFS}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 25.07 AC. x 3.26 CFS/AC.

$$Q = 81.73 \text{ CFS}$$
$$TQ = 81.73 \text{ CFS}$$

BYPASS BASIN-  
POST-DEVELOPED:

ONSITE: 2.08 AC. x 3.26 CFS/AC.

$$Q = 6.78 \text{ CFS}$$
$$TQ = 6.78 \text{ CFS}$$

DETENTION REQUIRED:

$$81.73 \text{ CFS} + 6.78 \text{ CFS} = 88.51 \text{ CFS} - 63.59 \text{ CFS} = 24.92 \text{ CFS}$$
$$24.92 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 29,904 \text{ CU.FT.}$$

(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$$81.73 \text{ CFS} - 24.92 \text{ CFS} = 56.81 \text{ CFS}$$

PEAK OUTFLOW = 39.60 CFS @ 31 MINUTES

PROJECT NAME Hutchings Farms  
 PROJECT #/JOB ORDER # 95-234/34869  
 DATE 10-16-96  
 DESIGNER V. Kendrick / T. Dietz.  
 PAGE 8 of 11

**PICKETT RAY & SILVER**

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

Civil Engineers  
 Planners  
 Land Surveyors

397-1211

\*\*\*\*\*  
 \*  
 \* RECTANGULAR ORIFICE \*  
 \* 18 in W X 36 in H ELEV= 567 \*  
 \*  
 \* Outlet Pipe - 36 ft - 42 in pipe \*  
 \* UFL= 567 LFL= 566.5 n= .013 \*  
 \*  
 \* Overflow Structure - Standpipe \*  
 \* DIAM= 60 in STANDPIPE ELEV= 573 \*  
 \*  
 \*\*\*\*\*

HUTCHINGS FARM 10-16-96 SUBMITTAL DATE:					
MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	245.19	245.19	0.00	245.19	567.05
2	490.38	735.57	2.70	732.87	567.15
3	735.57	1468.44	13.94	1454.50	567.30
4	980.76	2435.26	38.98	2396.28	567.50
5	1225.95	3622.23	82.41	3539.82	567.74
6	1471.14	5010.96	147.96	4863.00	568.01
7	1716.33	6579.33	235.84	6343.49	568.14
8	1961.52	8305.01	284.37	8020.64	568.29
9	2206.71	10227.35	342.91	9884.44	568.46
10	2451.90	12336.34	412.09	11924.25	568.64
11	2697.09	14621.34	492.53	14128.81	568.84
12	2942.28	17071.09	584.66	16486.43	569.05
13	3187.47	19673.90	688.85	18985.05	569.28
14	3432.66	22417.71	805.32	21612.39	569.52
15	3677.85	25290.24	934.16	24356.08	569.76
16	3923.04	28279.12	1075.38	27203.74	570.02
17	4168.23	31371.97	1627.69	29744.28	570.20
18	4413.42	34157.70	1721.64	32436.06	570.39
19	4658.61	37094.67	1815.86	35278.82	570.59
20	4903.80	40182.62	1910.34	38272.28	570.80
21	4658.61	42930.89	2005.03	40925.86	570.99
22	4413.42	45339.28	2085.39	43253.89	571.15
23	4168.23	47422.12	2153.41	45268.72	571.30
24	3923.04	49191.76	2210.58	46981.18	571.42
25	3677.85	50659.03	2258.04	48400.99	571.52
26	3432.66	51833.65	2296.66	49536.99	571.60
27	3187.47	52724.46	2327.08	50397.38	571.66
28	2942.28	53339.66	2349.88	50989.78	571.70
29	2697.09	53686.87	2365.44	51321.44	571.73
30	2451.90	53773.34	2374.10	51399.24	571.73
31	2206.71	53605.95	2376.12	51229.83	571.72
32	1961.52	53191.35	2371.72	50819.63	571.69
33	1716.33	52535.96	2360.97	50174.99	571.65
34	1471.14	51646.13	2343.99	49302.13	571.58
35	1225.95	50528.08	2320.82	48207.26	571.51
36	980.76	49188.03	2291.44	46896.59	571.41
37	735.57	47632.16	2255.72	45376.44	571.30
38	490.38	45866.82	2213.59	43653.23	571.18
39	245.19	43898.42	2164.86	41733.56	571.05
40	0.00	41733.56	2109.23	39624.33	570.90

PEAK OUTFLOW= 39.6 CFS AT 31 MINUTES

**PICKETT RAY & SILVER**

Civil Engineers  
Planners  
Land Surveyors

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

397-1211

PROJECT NAME Hutchings Farms  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER J. Kendrick / T. Dietz  
PAGE 9 of 11

**BASIN @ LOT 72  
STORMWATER DETENTION  
DESIGN STORM/100 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 27.53 AC. x 2.95 CFS/AC.

$$\frac{Q = 81.21 \text{ CFS}}{TQ = 81.21 \text{ CFS}}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 25.07 AC. x 4.17 CFS/AC.

$$\frac{Q = 104.54 \text{ CFS}}{TQ = 104.54 \text{ CFS}}$$

BYPASS BASIN-  
POST-DEVELOPED:

ONSITE: 2.08 AC. x 4.17 CFS/AC.

$$\frac{Q = 8.67 \text{ CFS}}{TQ = 8.67 \text{ CFS}}$$

DETENTION REQUIRED:

$$104.54 \text{ CFS} + 8.67 \text{ CFS} = 113.21 \text{ CFS} + 8.121 \text{ CFS} = 32.00 \text{ CFS}$$
$$32.00 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 38,400 \text{ CU.FT. (VOLUME)}$$

ALLOWABLE RELEASE FROM BASIN:

$$104.54 \text{ CFS} - 32.00 \text{ CFS} = 72.54 \text{ CFS}$$

PEAK OUTFLOW = 45.55 CFS @ 32 MINUTES



PROJECT NAME Hutchings Farms  
 PROJECT #/JOB ORDER # 95-234/34869  
 DATE 10-16-96  
 DESIGNER V. Kendrick / T. Dietz  
 PAGE 10 of 11

**PICKETT RAY & SILVER**

Civil Engineers  
 Planners  
 Land Surveyors  
 333 Mid Rivers Mall Dr.  
 St. Peters, MO 63376  
 397-1211

```

*****
*
* RECTANGULAR ORIFICE
* 18 in W X 36 in H ELEV= 567
*
* Outlet Pipe - 36 ft - 42 in pipe
* UFL= 567 LFL= 566.5 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 60 in STANDPIPE ELEV= 573
*
*****
  
```

HUTCHINGS FARM 10-16-96 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	313.62	313.62	0.00	313.62	567.07
2	627.24	940.86	3.90	936.96	567.20
3	940.86	1877.82	20.15	1857.67	567.39
4	1254.48	3112.15	56.25	3055.90	567.64
5	1568.10	4624.00	118.68	4505.32	567.94
6	1881.72	6387.04	212.45	6174.59	568.12
7	2195.34	8369.93	278.70	8091.23	568.30
8	2508.96	10600.19	345.45	10254.74	568.49
9	2822.58	13077.32	426.35	12650.97	568.71
10	3136.20	15787.17	522.31	15264.86	568.94
11	3449.82	18714.68	634.18	18080.50	569.20
12	3763.44	21843.94	762.47	21081.47	569.47
13	4077.06	25158.53	907.64	24250.89	569.75
14	4390.68	28641.57	1069.83	27571.75	570.04
15	4704.30	32276.05	1641.62	30634.43	570.26
16	5017.92	35652.35	1753.36	33898.99	570.49
17	5331.54	39230.53	1865.10	37365.43	570.74
18	5645.16	43010.59	1976.83	41033.76	571.00
19	5958.78	46992.54	2088.58	44903.96	571.27
20	6272.40	51176.36	2200.36	48976.01	571.56
21	5958.78	54934.79	2312.12	52622.68	571.82
22	5645.16	58267.84	2407.79	55860.05	572.04
23	5331.54	61191.59	2486.35	58705.24	572.20
24	5017.92	63723.16	2542.64	61180.52	572.34
25	4704.30	65884.82	2590.64	63294.18	572.46
26	4390.68	67684.86	2630.93	65053.93	572.56
27	4077.06	69131.00	2663.99	66467.00	572.64
28	3763.44	70230.44	2690.26	67540.18	572.70
29	3449.82	70990.00	2710.04	68279.96	572.75
30	3136.20	71416.16	2723.58	68692.57	572.77
31	2822.58	71515.15	2731.11	68784.04	572.78
32	2508.96	71293.00	2732.79	68560.21	572.76
33	2195.34	70755.55	2728.71	68026.85	572.73
34	1881.72	69908.56	2718.96	67189.60	572.68
35	1568.10	68757.71	2703.58	66054.12	572.62
36	1254.48	67308.60	2682.62	64625.97	572.54
37	940.86	65566.83	2656.00	62910.83	572.44
38	627.24	63538.07	2623.66	60914.40	572.33
39	313.62	61228.02	2585.51	58642.51	572.20
40	0.00	58642.51	2541.42	56101.09	572.05

PEAK OUTFLOW= 45.55 CFS AT 32 MINUTES

# PICKETT RAY & SILVER

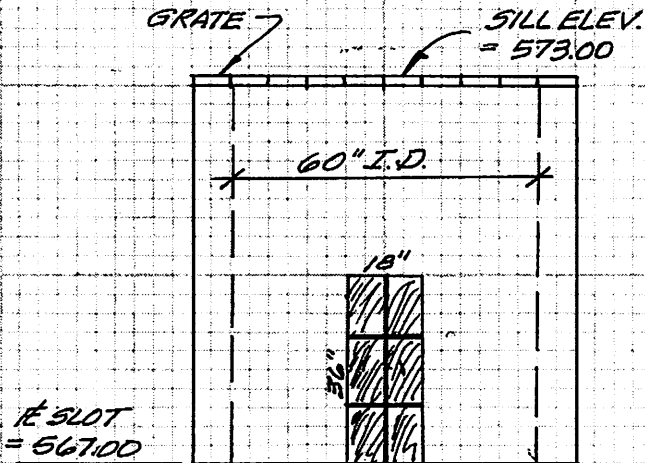
333 Mid Rivers Mall Dr.  
St. Peters, MD 63376

Civil Engineers  
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Land Surveyors

397-1211

PROJECT NAME Hutching Farms  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER J. Kendrick / T. Dietz  
PAGE 11 of 11

ELEVATION	AREA	VOLUME	CUM. VOLUME
567.00	0	4805	4805
568.00	9610	22165	26970
570.00	12555	28210	55180
572.00	15655	35107	90287
574.00	19452	42702	132989
576.00	23250		



CHECK LOWFLOW BLOCKED:  
WEIR EQUATION:

(25 YR./20 MIN.)

$$Q_{25} = CLH^{3/2}$$

$$81.73 = (3.0)(15.71)H^{3/2}$$

$$81.73 = (47.13)H^{3/2}$$

$$\left(\frac{81.73}{47.13}\right)^{2/3} = H$$

$$1.44 = H$$

$$573.00 + 1.44' = 574.44$$

(SILL ELEV.)

$$DAM ELEV. = 576.00$$

$$FREEBOARD_{25YR.} = 1.56 \text{ Feet}$$

$$100 YR. H.W. ELEV. = 572.78$$

$$FREEBOARD_{100YR.} = 3.22 \text{ Feet}$$

(TOP DAM to H.W. Elev.)

OUTFALL STRUCTURE

# O.S. 79

N.T.S.

60" INSIDE DIAMETER STANDPIPE  
W/ GRATE ON SILL.

APPROVED

DK  
CK

**PICKETT RAY & SILVER**

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397-1211

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 12-17-96  
DESIGNER J. Kendrick  
PAGE 1 of 11.

BASIN @ LOT 99  
STORMWATER DETENTION  
DESIGN STORM: 2 YR. / 20 MIN.

PRE-DEVELOPED CONDITIONS:

ONSITE: 13.81 AC. X 1.20 CFS/AC.

$$\frac{Q = 16.57 \text{ CFS}}{TQ = 16.57 \text{ CFS}}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 13.18 AC. X 1.67 CFS/AC.

$$\frac{Q = 22.01 \text{ CFS}}{TQ = 22.01 \text{ CFS}}$$

BYPASS BASIN:-

POST DEVELOPED:

ONSITE: 1.20 AC. X 1.67 CFS/AC.

$$\frac{Q = 2.00 \text{ CFS}}{TQ = 2.00 \text{ CFS}}$$

DETENTION REQUIRED:

$$22.01 \text{ CFS} + 2.00 \text{ CFS} = 24.01 \text{ CFS} - 16.57 \text{ CFS} = 7.44 \text{ CFS}$$
$$7.44 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 8,928 \text{ CU.FT. (VOLUME)}$$

ALLOWABLE RELEASE FROM BASIN:

$$22.01 \text{ CFS} - 7.44 \text{ CFS} = 14.57 \text{ CFS}$$

PEAK OUTFLOW = 2.94 CFS @ 10 MINUTES

# PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.  
St. Peters, MD 21156

Civil Engineers  
Planners  
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397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234/34869

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

PAGE 2 of 11.

```

*****
*
* RECTANGULAR ORIFICE
* 16 in W X 8 in H ELEV= 590.3
*
* Outlet Pipe - 22.93 ft - 24 in pipe
* UFL= 590.3 LFL= 589.64 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 48 in STANDPIPE ELEV= 594.5
*
*****
    
```

HUTCHINGS FARM 1-17-97 SUBMITTAL DATE: REV1-17-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	66.03	66.03	0.00	66.03	590.31
2	132.06	198.09	0.35	197.74	590.34
3	198.09	395.83	1.79	394.04	590.38
4	264.12	658.16	5.03	653.13	590.44
5	330.15	983.28	10.75	972.53	590.51
6	396.18	1368.71	19.52	1349.19	590.59
7	462.21	1811.40	31.91	1779.49	590.68
8	528.24	2307.73	48.34	2259.39	590.78
9	594.27	2853.66	69.15	2784.51	590.89
10	660.30	3444.81	94.61	3350.20	591.01
11	726.33	4076.53	160.58	3915.95	591.13
12	792.36	4708.31	184.33	4523.98	591.26
13	858.39	5382.37	206.83	5175.54	591.40
14	924.42	6099.96	228.50	5871.46	591.55
15	990.45	6861.91	249.58	6612.34	591.70
16	1056.48	7668.82	270.21	7398.61	591.87
17	1122.51	8521.12	290.51	8230.61	592.02
18	1188.54	9419.15	307.55	9111.61	592.10
19	1254.57	10366.18	316.43	10049.75	592.19
20	1320.60	11370.35	325.63	11044.72	592.28
21	1254.57	12299.29	335.10	11964.19	592.37
22	1188.54	13152.73	343.63	12809.10	592.44
23	1122.51	13931.61	351.28	13580.33	592.51
24	1056.48	14636.81	358.12	14278.69	592.58
25	990.45	15269.14	364.21	14904.93	592.64
26	924.42	15829.35	369.58	15459.77	592.69
27	858.39	16318.16	374.27	15943.89	592.73
28	792.36	16736.25	378.32	16357.93	592.77
29	726.33	17084.26	381.75	16702.51	592.80
30	660.30	17362.81	384.58	16978.23	592.83
31	594.27	17572.50	386.83	17185.67	592.85
32	528.24	17713.91	388.51	17325.40	592.86
33	462.21	17787.61	389.64	17397.97	592.87
34	396.18	17794.15	390.23	17403.92	592.87
35	330.15	17734.07	390.28	17343.79	592.86
36	264.12	17607.91	389.79	17218.12	592.85
37	198.09	17416.21	388.78	17027.43	592.83
38	132.06	17159.49	387.23	16772.26	592.81
39	66.03	16838.29	385.15	16453.14	592.78
40	0.00	16453.14	382.53	16070.61	592.74

PEAK OUTFLOW= 6.5 CFS AT 35 MINUTES



**PICKETT RAY & SILVER**

333 Mid Rivers Mall Dr.  
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Civil Engineers  
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Land Surveyors

397-1211

PROJECT NAME Hutchings Farm  
PROJECT #/JOB ORDER # 05-234/34849  
DATE 12-17-96  
DESIGNER J. Kendrick  
PAGE 3 of 11.

**BASIN @ LOT 99  
STORMWATER DETENTION  
DESIGN STORM: 5 YR. / 20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 13.81 AC. X 1.51 CFS/AC.

$$\frac{Q = 20.85 \text{ CFS}}{TQ = 20.85 \text{ CFS}}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 13.18 AC. X 2.12 CFS/AC.

$$\frac{Q = 27.94 \text{ CFS}}{TQ = 27.94 \text{ CFS}}$$

BYPASS BASIN:-

POST DEVELOPED:

ONSITE: 1.20 AC. X 2.12 CFS/AC.

$$\frac{Q = 2.54 \text{ CFS}}{TQ = 2.54 \text{ CFS}}$$

DETENTION REQUIRED:

$$27.94 \text{ CFS} + 2.54 \text{ CFS} = 30.48 \text{ CFS} - 20.85 \text{ CFS} = 9.63 \text{ CFS}$$
$$9.63 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 11,556 \text{ CU.FT. (VOLUME)}$$

ALLOWABLE RELEASE FROM BASIN:

$$27.94 \text{ CFS} - 9.63 \text{ CFS} = 18.31 \text{ CFS}$$

PEAK OUTFLOW = 8.18 CFS @ 35 MINUTES

# PICKETT RAY & SILVER

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

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Land Surveyors

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PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # \_\_\_\_\_

95-234/34869

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

PAGE \_\_\_\_\_

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*****
* RECTANGULAR ORIFICE
* 16 in W X 8 in H ELEV= 590.3
*
* Outlet Pipe - 22.93 ft - 24 in pipe
* UFL= 590.3 LFL= 589.64 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 48 in STANDPIPE ELEV= 594.5
*
*****
    
```

HUTCHINGS FARM 1-17-97 SUBMITTAL DATE: REV1-17-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	83.82	83.82	0.00	83.82	590.32
2	167.64	251.46	0.49	250.97	590.35
3	251.46	502.43	2.56	499.87	590.41
4	335.28	835.15	7.20	827.95	590.48
5	419.10	1247.05	15.34	1231.71	590.56
6	502.92	1734.63	27.83	1706.80	590.66
7	586.74	2293.54	45.41	2248.13	590.78
8	670.56	2918.69	68.64	2850.05	590.91
9	754.38	3604.43	97.96	3506.47	591.04
10	838.20	4344.67	167.48	4177.19	591.19
11	922.02	5099.21	194.32	4904.89	591.34
12	1005.84	5910.73	219.76	5690.97	591.51
13	1089.66	6780.63	244.28	6536.35	591.69
14	1173.48	7709.83	268.17	7441.66	591.88
15	1257.30	8698.96	291.58	8407.38	592.04
16	1341.12	9748.50	309.35	9439.15	592.13
17	1424.94	10864.09	319.67	10544.42	592.23
18	1508.76	12053.18	330.37	11722.81	592.34
19	1592.58	13315.39	341.41	12973.98	592.46
20	1676.40	14650.38	352.76	14297.62	592.58
21	1592.58	15890.20	364.37	15525.83	592.69
22	1508.76	17034.59	374.83	16659.76	592.80
23	1424.94	18084.70	384.23	17700.47	592.90
24	1341.12	19041.59	392.66	18648.93	592.98
25	1257.30	19906.23	400.19	19506.04	593.06
26	1173.48	20679.52	406.87	20272.65	593.13
27	1089.66	21362.31	412.76	20949.56	593.20
28	1005.84	21955.40	417.89	21537.52	593.25
29	922.02	22459.54	422.29	22037.25	593.30
30	838.20	22875.45	426.00	22449.45	593.33
31	754.38	23203.83	429.03	22774.80	593.36
32	670.56	23445.36	431.41	23013.95	593.39
33	586.74	23600.69	433.15	23167.54	593.40
34	502.92	23670.46	434.26	23236.20	593.41
35	419.10	23655.30	434.76	23220.54	593.40
36	335.28	23555.82	434.65	23121.17	593.40
37	251.46	23372.63	433.93	22938.70	593.38
38	167.64	23106.34	432.60	22673.74	593.35
39	83.82	22757.56	430.67	22326.89	593.32
40	0.00	22326.89	428.13	21898.76	593.28

PEAK OUTFLOW= 7.25 CFS AT 35 MINUTES



**PICKETT RAY & SILVER**

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

Civil Engineers  
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397-1211

PROJECT NAME HUTCHING FARMS

PROJECT #/JOB ORDER # 95-234/34869

DATE 10-16-96

DESIGNER J. Kendrick / T. Dietz

PAGE 5 of 11

BASIN @ LOT 99  
STORMWATER DETENTION  
DESIGN STORM: 15 YR./20 MIN.

PRE-DEVELOPED CONDITIONS:

ONSITE: 13.81 AC. x 1.87 CFS/AC.

$$\frac{Q = 25.82 \text{ CFS}}{TQ = 25.82 \text{ CFS}}$$

POST-DEVELOPED Q TO BASIN:

ONSITE: 13.18 AC. x 2.64 CFS/AC.

$$\frac{Q = 34.80 \text{ CFS}}{TQ = 34.80 \text{ CFS}}$$

BYPASS BASIN -

POST DEVELOPED:

ONSITE: 1.20 AC. x 2.64 CFS/AC.

$$\frac{Q = 3.17 \text{ CFS}}{TQ = 3.17 \text{ CFS}}$$

DETENTION REQUIRED:

$$34.80 \text{ CFS} + 3.17 \text{ CFS} = 37.97 \text{ CFS} - 25.82 \text{ CFS} = 12.15 \text{ CFS}$$
$$12.15 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 14,580 \text{ CU. FT. (VOLUME)}$$

ALLOWABLE RELEASE FROM BASIN:

$$34.80 \text{ CFS} - 12.15 \text{ CFS} = 22.65 \text{ CFS}$$

PEAK OUTFLOW = 9.22 CFS @ 35 MIN.

# PICKETT RAY & SILVER

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME \_\_\_\_\_  
 PROJECT #/JOB ORDER # 95-234  
 DATE \_\_\_\_\_  
 DESIGNER \_\_\_\_\_  
 PAGE 6 of 11.

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*****
*
* RECTANGULAR ORIFICE
* 16 in W X 8 in H ELEV= 590.3
*
* Outlet Pipe - 22.93 ft - 24 in pipe
* UFL= 590.3 LFL= 589.64 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 48 in STANDPIPE ELEV= 594.5
*
*****
    
```

HUTCHINGS FARM 1-17-97 SUBMITTAL DATE: REV1-17-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	104.40	104.40	0.00	104.40	590.32
2	208.80	313.20	0.69	312.51	590.37
3	313.20	625.71	3.56	622.15	590.43
4	417.60	1039.75	9.99	1029.76	590.52
5	522.00	1551.76	21.28	1530.48	590.63
6	626.40	2156.88	38.55	2118.33	590.75
7	730.80	2849.13	62.78	2786.35	590.89
8	835.20	3621.55	94.71	3526.84	591.05
9	939.60	4466.44	168.36	4298.08	591.21
10	1044.00	5342.08	198.76	5143.32	591.39
11	1148.40	6291.72	227.48	6064.24	591.59
12	1252.80	7317.04	255.11	7061.93	591.80
13	1357.20	8419.13	282.00	8137.13	592.01
14	1461.60	9598.73	306.59	9292.14	592.12
15	1566.00	10858.14	318.22	10539.92	592.23
16	1670.40	12210.32	330.33	11879.99	592.36
17	1774.80	13654.79	342.86	13311.93	592.49
18	1879.20	15191.13	355.76	14835.37	592.63
19	1983.60	16818.97	368.98	16449.99	592.78
20	2088.00	18537.99	382.51	18155.48	592.94
21	1983.60	20139.08	396.29	19742.79	593.08
22	1879.20	21621.99	408.70	21213.29	593.22
23	1774.80	22988.09	419.87	22568.22	593.34
24	1670.40	24238.62	429.90	23808.72	593.46
25	1566.00	25374.72	438.89	24935.84	593.56
26	1461.60	26397.44	446.89	25950.55	593.66
27	1357.20	27307.75	453.98	26853.77	593.74
28	1252.80	28106.57	460.20	27646.37	593.81
29	1148.40	28794.77	465.59	28329.18	593.88
30	1044.00	29373.18	470.18	28903.00	593.93
31	939.60	29842.60	474.00	29368.60	593.97
32	835.20	30203.80	477.09	29726.71	594.00
33	730.80	30457.51	479.36	29978.15	594.02
34	626.40	30604.55	480.67	30123.88	594.03
35	522.00	30645.88	481.42	30164.46	594.04
36	417.60	30582.06	481.63	30100.43	594.03
37	313.20	30413.63	481.30	29932.33	594.02
38	208.80	30141.13	480.43	29660.70	594.00
39	104.40	29765.10	479.01	29286.09	593.96
40	0.00	29286.09	476.54	28809.55	593.92

PEAK OUTFLOW= 8.03 CFS AT 36 MINUTES

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME HUTCHING FARMS

PROJECT #/JOB ORDER # 95-234/34869

DATE 10-16-96

DESIGNER J. Kendrick / T. Dietz

PAGE 7 of 11

**BASIN @ LOT 99  
STORMWATER DETENTION  
DESIGN STORM: 25 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 13.81 AC. X 2.31 CFS/AC.

$Q = 31.90 \text{ CFS}$

$TQ = 31.90 \text{ CFS}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 13.18 AC. X 3.26 CFS/AC.

$Q = 42.97 \text{ CFS}$

$TQ = 42.97 \text{ CFS}$

BYPASS BASIN-

POST DEVELOPED:

ONSITE: 1.20 AC. X 3.26 CFS/AC.

$Q = 3.91 \text{ CFS}$

$TQ = 3.91 \text{ CFS}$

DETENTION REQUIRED:

$42.97 \text{ CFS} + 3.91 \text{ CFS} = 46.88 \text{ CFS} - 31.90 \text{ CFS} = 14.98 \text{ CFS}$

$14.98 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 17,976 \text{ CU.FT.}$   
(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$42.97 \text{ CFS} - 14.98 \text{ CFS} = 27.99 \text{ CFS}$

PEAK OUTFLOW = 20.64 CFS @ 31 MIN.

# PICKETT RAY & SILVER

Civil Engineers  
Planners  
Land Surveyors

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

397-1211

PROJECT NAME \_\_\_\_\_

PROJECT #/JOB ORDER # 95-234/34869

DATE \_\_\_\_\_

DESIGNER \_\_\_\_\_

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*****
* RECTANGULAR ORIFICE *
* 16 in W X 8 in H ELEV= 590.3 *
* *
* Outlet Pipe - 22.93 ft - 24 in pipe *
* UFL= 590.3 LPI = 589.64 n= .013 *
* *
* Overflow Structure - Standpipe *
* DIAM= 48 in STANDPIPE ELEV= 594.5 *
* *
*****
    
```

HUTCHINGS FARM 1-17-97 SUBMITTAL DATE: REV1-17-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	128.91	128.91	0.00	128.91	590.33
2	257.82	386.73	0.94	385.79	590.38
3	386.73	772.52	4.88	767.64	590.46
4	515.64	1283.28	13.69	1269.59	590.57
5	644.55	1914.14	29.13	1885.01	590.70
6	773.46	2658.47	52.70	2605.77	590.85
7	902.37	3508.14	85.64	3422.50	591.03
8	1031.28	4453.78	163.80	4289.98	591.21
9	1160.19	5450.17	198.47	5251.70	591.42
10	1289.10	6540.80	230.90	6309.90	591.64
11	1418.01	7727.91	261.99	7465.93	591.89
12	1546.92	9012.85	292.19	8720.66	592.07
13	1675.83	10396.49	312.52	10083.97	592.19
14	1804.74	11888.71	325.96	11562.75	592.33
15	1933.65	13496.40	339.94	13156.47	592.48
16	2062.56	15219.03	354.38	14864.65	592.63
17	2191.47	17056.12	369.24	16686.88	592.80
18	2320.38	19007.26	384.45	18622.81	592.98
19	2449.29	21072.10	399.99	20672.12	593.17
20	2578.20	23250.32	415.79	22834.53	593.37
21	2449.29	25283.82	431.85	24851.97	593.56
22	2320.38	27172.35	446.30	26726.05	593.73
23	2191.47	28917.52	459.33	28458.20	593.89
24	2062.56	30520.76	471.04	30049.72	594.03
25	1933.65	31983.37	481.04	31502.33	594.13
26	1804.74	33307.07	488.51	32818.56	594.23
27	1675.83	34494.39	495.19	33999.20	594.32
28	1546.92	35546.12	501.11	35045.01	594.39
29	1418.01	36463.02	506.28	35956.74	594.46
30	1289.10	37245.84	510.76	36735.08	594.52
31	1160.19	37895.27	519.26	37376.01	594.56
32	1031.28	38407.29	550.96	37856.34	594.60
33	902.37	38758.71	583.95	38174.76	594.62
34	773.46	38948.22	609.87	38338.36	594.63
35	644.55	38982.91	623.86	38359.05	594.64
36	515.64	38874.69	625.69	38249.00	594.63
37	386.73	38635.73	616.15	38019.59	594.61
38	257.82	38277.41	597.17	37680.24	594.59
39	128.91	37809.15	571.11	37238.04	594.55
40	0.00	37238.04	542.75	36695.29	594.51

PEAK OUTFLOW= 10.43 CFS AT 36 MINUTES

**PICKETT RAY & SILVER**

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

Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME HUTCHING FARMS

PROJECT #/JOB ORDER # 95-234/34869

DATE 10-10-96

DESIGNER J. Kendrick / T. Dietz

PAGE 9 of 11.

BASIN @ LOT 99  
STORMWATER DETENTION  
DESIGN STORM: 100 YR/20MIN.

PRE-DEVELOPED CONDITIONS:

ONSITE: 13.81 AC. X 2.95 CFS/AC.

$Q = 40.74 \text{ CFS}$

$TQ = 40.74 \text{ CFS}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 13.18 AC. X 4.17 CFS/AC.

$Q = 54.96 \text{ CFS}$

$TQ = 54.96 \text{ CFS}$

BYPASS BASIN -

POST DEVELOPED:

ONSITE: 1.20 AC. X 4.17 CFS/AC.

$Q = 5.00 \text{ CFS}$

$TQ = 5.00 \text{ CFS}$

DETENTION REQUIRED:

$54.96 \text{ CFS} + 5.00 \text{ CFS} = 59.96 \text{ CFS} - 40.74 \text{ CFS} = 19.22 \text{ CFS}$

$19.22 \text{ CFS} \times 20 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 23,064 \text{ CU. FT.}$   
(VOLUME)

ALLOWABLE RELEASE FROM BASIN:

$54.96 \text{ CFS} - 19.22 \text{ CFS} = 35.74 \text{ CFS}$

PEAK OUTFLOW = 37.06 CFS @ 27 MIN.



# PICKETT RAY & SILVER

Civil Engineers  
Planners  
Land Surveyors

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

397-1211

PROJECT NAME \_\_\_\_\_  
PROJECT #/JOB ORDER # 95-234/34869  
DATE \_\_\_\_\_  
DESIGNER \_\_\_\_\_  
PAGE 10 of 11.

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*****
*                               *
* RECTANGULAR ORIFICE          *
* 16 in W X 8 in H   ELEV= 590.3 *
*                               *
* Outlet Pipe - 22.93 ft - 48 in pipe *
* UFL= 590.3   LFL= 589.64   n= .013 *
*                               *
* Overflow Structure - Standpipe *
* DIAM= 48 in   STANDPIPE ELEV= 594.5 *
*                               *
*****
    
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HUTCHINGS FARM                      1-17-97                      SUBMITTAL DATE: REV1-17-97

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	164.88	164.88	0.00	164.88	590.34
2	329.76	494.64	1.36	493.28	590.40
3	494.64	987.92	7.06	980.86	590.51
4	659.52	1640.38	19.78	1620.60	590.64
5	824.40	2445.00	42.01	2402.99	590.81
6	989.28	3392.27	75.84	3316.43	591.00
7	1154.16	4470.59	159.04	4311.55	591.22
8	1319.04	5630.59	199.25	5431.34	591.45
9	1483.92	6915.26	236.46	6678.80	591.72
10	1648.80	8327.60	271.98	8055.62	592.00
11	1813.68	9869.30	305.75	9563.55	592.14
12	1978.56	11542.11	320.90	11221.21	592.30
13	2143.44	13364.65	336.76	13027.89	592.46
14	2308.32	15336.21	353.24	14982.98	592.64
15	2473.20	17456.18	370.25	17085.93	592.84
16	2638.08	19724.01	387.71	19336.31	593.05
17	2802.96	22139.27	405.56	21733.71	593.27
18	2967.84	24701.55	423.75	24277.80	593.50
19	3132.72	27410.52	442.24	26968.28	593.75
20	3297.60	30265.88	460.99	29804.90	594.01
21	3132.72	32937.62	479.77	32457.85	594.20
22	2967.84	35425.69	493.37	34932.32	594.39
23	2802.96	37735.28	505.73	37229.55	594.55
24	2638.08	39867.63	542.28	39325.36	594.71
25	2473.20	41798.56	723.59	41074.97	594.84
26	2308.32	43383.29	945.19	42438.10	594.94
27	2143.44	44581.54	1155.40	43426.14	595.01
28	1978.56	45404.70	1334.92	44069.78	595.05
29	1813.68	45883.46	1467.69	44415.77	595.08
30	1648.80	46064.57	1532.77	44531.80	595.09
31	1483.92	46015.72	1555.09	44460.63	595.08
32	1319.04	45779.67	1541.36	44238.31	595.07
33	1154.16	45392.47	1499.27	43893.20	595.04
34	989.28	44882.48	1418.09	43464.39	595.01
35	824.40	44288.79	1341.51	42947.28	594.97
36	659.52	43606.80	1252.31	42354.49	594.93
37	494.64	42849.13	1142.14	41706.99	594.88
38	329.76	42036.75	1042.39	40994.36	594.83
39	164.88	41159.24	934.11	40225.13	594.77
40	0.00	40225.13	832.57	39392.56	594.71

PEAK OUTFLOW= 25.92 CFS AT 31 MINUTES

# PICKETT RAY & SILVER

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

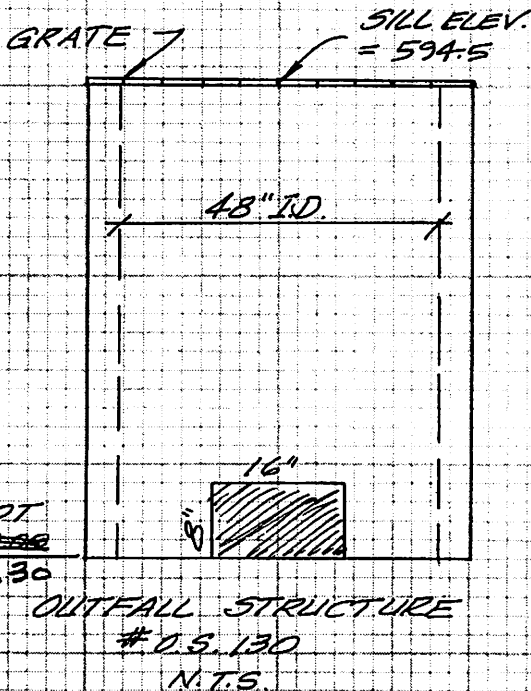
Civil Engineers  
Planners  
Land Surveyors

397-1211

PROJECT NAME Hutching Farms  
PROJECT #/JOB ORDER # 95-234/34869  
DATE 10-16-96  
DESIGNER J. Kendrick / T. Dietz  
PAGE 11 of 11

## BASIN @ LOT 99

ELEVATION	AREA	VOLUME	CUM. VOLUME
590.30	0	8003	8003
592.00	9416	21662	29665
594.00	12246	27320	56985
596.00	15074	7972	64958
596.50	16816		



CHECK LOWFLOW BLOCKED:  
WEIR EQUATION:  
(25YR./20MIN.)

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

$$42.97 = (3.0)(12.57)H^{3/2}$$

$$42.97 = (37.71)H^{3/2}$$

$$\left(\frac{42.97}{37.71}\right)^{2/3} = H$$

$$1.09' = H$$

$$594.50 + 1.09' = 595.59$$

(SILL ELEV.)

$$\text{DAM ELEV.} = 596.50$$

$$\text{FREEBOARD}_{25\text{YR.}} = 0.91 \text{ Feet}$$

$$100\text{YR. H.W. ELEV.} = 595.29$$

$$\text{FREEBOARD}_{100\text{YR.}} = 1.21 \text{ Feet}$$

(TOP DAM to H.W. Elev.)

48" INSIDE DIAMETER STANDPIPE  
w/ GRATE ON SILL.