

PICKETT RAY & SILVER

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

Civil Engineers
Planners
Land Surveyors

397-1211

PROJECT NAME Hutchings Farm Ph. 2
PROJECT #/JOB ORDER # 95-234/34869
DATE Feb. 8, 1997
DESIGNER J. Kendrick
PAGE 1 of 11.

Review again with Phase 2
improvement plans.

BASIN @ LOT 315
STORMWATER DETENTION
DESIGN STORM: 2 YR. / 20 MIN.

PRE-DEVELOPED CONDITIONS:

ONSITE: 14.85 ACRES x 1.20 CFS/AC.
OFFSITE: 0.08 ACRES x 1.20 CFS/AC.

$Q = 17.82 \text{ cfs}$

$Q = 0.10 \text{ cfs}$

$TQ = 17.92 \text{ cfs}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 7.58 ACRES x 1.67 CFS/AC.

$Q = 12.66 \text{ cfs}$

$TQ = 12.66 \text{ cfs}$

(CFM = 759.6)

BYPASS BASIN -
POST-DEVELOPED:

ONSITE: 8.83 ACRES x 1.67 CFS/AC.
OFFSITE: 0.08 ACRES x 1.67 CFS/AC.

$Q = 14.75 \text{ cfs}$

$Q = 0.13 \text{ cfs}$

$T.Q. = 14.88 \text{ cfs}$

DETENTION REQUIRED:

$12.66 \text{ cfs} + 14.88 \text{ cfs} = 27.54 \text{ cfs} - 17.92 \text{ cfs} = 9.62 \text{ cfs}$

$9.62 \text{ cfs} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 17,316 \text{ CU. FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$12.66 \text{ cfs} - 9.62 \text{ cfs} = 3.04 \text{ cfs}$

PEAK OUTFLOW = 3.06 @ 30 min



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2 YR. 120 MIN.

```
*****
*
* RECTANGULAR ORIFICE
* 5 in W X 10 in H ELEV= 593
*
* Outlet Pipe - 160 ft - 24 in pipe
* UFL= 593 LFL= 589 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 60 in STANDPIPE ELEV= 599.2
*
*****
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HUTCHINGS FARM PHASE 2 2-8-97 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	37.98	37.98	0.00	37.98	593.05
2	75.96	113.94	0.79	113.15	593.16
3	113.94	227.09	4.08	223.01	593.31
4	151.92	374.93	11.28	363.65	593.51
5	189.90	553.55	23.48	530.07	593.74
6	227.88	757.95	41.32	716.63	594.00
7	265.86	982.49	77.86	904.63	594.07
8	303.84	1208.47	82.26	1126.21	594.15
9	341.82	1468.03	87.13	1380.90	594.24
10	379.80	1760.70	92.42	1668.28	594.34
11	417.78	2086.06	98.05	1988.01	594.46
12	455.76	2443.77	103.95	2339.82	594.58
13	493.74	2833.56	110.08	2723.48	594.72
14	531.72	3255.20	116.39	3138.81	594.87
15	569.70	3708.51	122.86	3585.65	595.03
16	607.68	4193.33	129.46	4063.87	595.20
17	645.66	4709.53	136.17	4573.36	595.38
18	683.64	5257.00	142.98	5114.02	595.58
19	721.62	5835.64	149.86	5685.78	595.78
20	759.60	6445.38	156.81	6288.57	596.00
21	721.62	7010.19	163.82	6846.37	596.09
22	683.64	7530.01	166.63	7363.38	596.17
23	645.66	8009.04	169.14	7839.90	596.24
24	607.68	8447.58	171.42	8276.16	596.31
25	569.70	8845.86	173.49	8672.37	596.37
26	531.72	9204.09	175.34	9028.75	596.43
27	493.74	9522.49	176.99	9345.50	596.48
28	455.76	9801.26	178.45	9622.81	596.52
29	417.78	10040.59	179.71	9860.88	596.56
30	379.80	10240.68	180.79	10059.89	596.59
31	341.82	10401.71	181.68	10220.03	596.62
32	303.84	10523.87	182.40	10341.47	596.63
33	265.86	10607.33	182.94	10424.39	596.65
34	227.88	10652.27	183.31	10468.96	596.65
35	189.90	10658.86	183.51	10475.35	596.66
36	151.92	10627.27	183.54	10443.73	596.65
37	113.94	10557.67	183.40	10374.27	596.64
38	75.96	10450.23	183.09	10267.14	596.62
39	37.98	10305.12	182.61	10122.51	596.60
40	0.00	10122.51	181.96	9940.55	596.57

PEAK OUTFLOW= 3.06 CFS AT 36 MINUTES

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**BASIN @ LOT 315
STORMWATER DETENTION
DESIGN STORM: 5 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 14.85 ACRES x 1.51 cfs/AC.
OFFSITE: 0.08 ACRES x 1.51 cfs/AC.

$Q = 22.42 \text{ cfs}$

$Q = 0.12 \text{ cfs}$

$TQ = 22.54 \text{ cfs}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 7.58 ACRES x 2.12 cfs/AC.

$Q = 16.07 \text{ cfs}$

$TQ = 16.07 \text{ cfs}$
(CFM = 964.2)

BYPASS BASIN -
POST-DEVELOPED:

ONSITE: 8.83 ACRES x 2.12 cfs/AC.
OFFSITE: 0.08 ACRES x 2.12 cfs/AC.

$Q = 18.72 \text{ cfs}$

$Q = 0.17 \text{ cfs}$

$TQ = 18.89 \text{ cfs}$

DETENTION REQUIRED:

$16.07 \text{ cfs} + 18.89 \text{ cfs} = 34.96 \text{ cfs} - 22.54 \text{ cfs} = 12.42 \text{ cfs}$

$12.42 \text{ cfs} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 22,356 \text{ CU. FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$16.07 \text{ cfs} - 12.42 \text{ cfs} = 3.65 \text{ cfs}$

PEAK OUTFLOW = 3.31 @ 36 mins

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5 YR./20 MIN.

 *
 * RECTANGULAR ORIFICE *
 * 5 in W X 10 in H ELEV= 593 *
 * *
 * Outlet Pipe - 160 ft - 24 in pipe *
 * UFL= 593 LFL= 589 n= .013 *
 * *
 * Overflow Structure - Standpipe *
 * DIAM= 60 in STANDPIPE ELEV= 599.2 *
 * *

HUTCHINGS FARM PHASE 2 2-8-97 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	48.21	48.21	0.00	48.21	593.07
2	96.42	144.63	1.13	143.50	593.20
3	144.63	288.13	5.82	282.31	593.39
4	192.84	475.15	16.06	459.09	593.64
5	241.05	700.14	33.30	666.84	593.93
6	289.26	956.10	73.07	883.03	594.06
7	337.47	1220.50	81.77	1138.73	594.15
8	385.68	1524.41	87.40	1437.01	594.26
9	433.89	1870.90	93.55	1777.35	594.38
10	482.10	2259.45	100.10	2159.35	594.52
11	530.31	2689.66	106.98	2582.68	594.67
12	578.52	3161.20	114.11	3047.09	594.84
13	626.73	3673.82	121.46	3552.36	595.02
14	674.94	4227.30	128.98	4098.32	595.21
15	723.15	4821.47	136.64	4684.83	595.42
16	771.36	5456.19	144.42	5311.77	595.65
17	819.57	6131.34	152.30	5979.04	595.89
18	867.78	6846.82	160.26	6686.56	596.06
19	915.99	7602.55	165.84	7436.71	596.18
20	964.20	8400.91	169.49	8231.42	596.30
21	915.99	9147.41	173.28	8974.13	596.42
22	867.78	9841.91	176.74	9665.17	596.53
23	819.57	10484.74	179.90	10304.84	596.63
24	771.36	11076.20	182.78	10893.42	596.72
25	723.15	11616.57	185.39	11431.18	596.81
26	674.94	12106.12	187.74	11918.38	596.88
27	626.73	12545.11	189.84	12355.27	596.95
28	578.52	12933.79	191.71	12742.08	597.01
29	530.31	13272.39	193.35	13079.04	597.06
30	482.10	13561.14	194.77	13366.37	597.11
31	433.89	13800.26	195.97	13604.29	597.15
32	385.68	13989.97	196.96	13793.01	597.18
33	337.47	14130.48	197.74	13932.74	597.20
34	289.26	14222.00	198.31	14023.69	597.21
35	241.05	14264.74	198.69	14066.05	597.22
36	192.84	14258.89	198.86	14060.03	597.22
37	144.63	14204.66	198.83	14005.83	597.21
38	96.42	14102.25	198.61	13903.64	597.19
39	48.21	13951.85	198.19	13753.66	597.17
40	0.00	13753.66	197.57	13556.09	597.14

PEAK OUTFLOW= 3.31 CFS AT 36 MINUTES

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DESIGNER J. Kendrick
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*BASIN @ LOT 315
STORMWATER DETENTION
DESIGN STORM: 15 YR./20 MIN.*

PRE-DEVELOPED CONDITIONS:

ONSITE: 14.85 AC. x 1.87 cfs/AC.
OFFSITE: 0.08 AC. x 1.87 cfs/AC.

$Q = 27.77 \text{ cfs}$

$Q = 0.15 \text{ cfs}$

$TQ = 27.92 \text{ cfs}$

POST-DEVELOPED Q TO BASIN:

ONSITE: 7.58 AC. x 2.64 cfs/AC.

$Q = 20.01 \text{ cfs}$

$TQ = 20.01 \text{ cfs}$

(CFM = 1200.6)

BYPASS BASIN -
POST DEVELOPED:

ONSITE: 8.83 AC. x 2.64 cfs/AC.
OFFSITE: 0.08 AC. x 2.64 cfs/AC.

$Q = 23.31 \text{ cfs}$

$Q = 0.21 \text{ cfs}$

$TQ = 23.52 \text{ cfs}$

DETENTION REQUIRED:

$20.01 \text{ cfs} + 23.52 \text{ cfs} = 43.53 \text{ cfs} - 27.92 \text{ cfs} = 15.61 \text{ cfs}$
 $15.61 \text{ cfs} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 28,098 \text{ CU. FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$20.01 \text{ cfs} - 15.61 \text{ cfs} = 4.40 \text{ cfs}$

PEAK OUTFLOW = 3.59 @ 37 min

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15 YR. / 20 MIN.

*
* RECTANGULAR ORIFICE *
* 5 in W X 10 in H ELEV= 593 *
* *
* Outlet Pipe - 160 ft - 24 in pipe *
* UFL= 593 LFL= 589 n= .013 *
* *
* Overflow Structure - Standpipe *
* DIAM= 60 in STANDPIPE ELEV= 599.2 *
* *

HUTCHINGS FARM PHASE 2 2-8-97 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	60.03	60.03	0.00	60.03	593.08
2	120.06	180.09	1.58	178.51	593.25
3	180.09	358.60	8.07	350.53	593.49
4	240.12	590.65	22.22	568.43	593.79
5	300.15	868.58	45.88	822.70	594.04
6	360.18	1182.88	80.38	1102.50	594.14
7	420.21	1522.71	86.63	1436.08	594.26
8	480.24	1916.32	93.53	1822.79	594.40
9	540.27	2363.06	100.94	2262.12	594.55
10	600.30	2862.42	108.75	2753.67	594.73
11	660.33	3414.00	116.87	3297.13	594.92
12	720.36	4017.49	125.24	3892.25	595.14
13	780.39	4672.64	133.80	4538.84	595.37
14	840.42	5379.26	142.53	5236.73	595.62
15	900.45	6137.18	151.38	5985.80	595.89
16	960.48	6946.28	160.34	6785.94	596.08
17	1020.51	7806.45	166.33	7640.12	596.21
18	1080.54	8720.66	170.47	8550.19	596.35
19	1140.57	9690.76	174.77	9515.99	596.51
20	1200.60	10716.59	179.22	10537.37	596.67
21	1140.57	11677.94	183.81	11494.13	596.82
22	1080.54	12574.67	188.01	12386.66	596.96
23	1020.51	13407.17	191.85	13215.32	597.09
24	960.48	14175.80	195.34	13980.46	597.21
25	900.45	14880.91	198.51	14682.40	597.32
26	840.42	15522.82	201.37	15321.45	597.42
27	780.39	16101.84	203.95	15897.89	597.51
28	720.36	16618.25	206.24	16412.01	597.59
29	660.33	17072.34	208.26	16864.08	597.66
30	600.30	17464.38	210.03	17254.36	597.72
31	540.27	17794.63	211.54	17583.09	597.77
32	480.24	18063.33	212.80	17850.53	597.81
33	420.21	18270.74	213.82	18056.91	597.85
34	360.18	18417.09	214.61	18202.48	597.87
35	300.15	18502.63	215.16	18287.47	597.88
36	240.12	18527.59	215.48	18312.11	597.89
37	180.09	18492.20	215.58	18276.62	597.88
38	120.06	18396.68	215.44	18181.24	597.86
39	60.03	18241.27	215.08	18026.19	597.84
40	0.00	18026.19	214.49	17811.70	597.81

PEAK OUTFLOW= 3.59 CFS AT 37 MINUTES

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DATE Feb. 8, 1997
DESIGNER J. Kendrick
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**BASIN @ LOT 315
STORMWATER DETENTION
DESIGN STORM: 25YR. / 20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 14.85 ACRES x 2.31 cfs/ac. Q = 34.30 cfs
OFFSITE: 0.08 ACRES x 2.31 cfs/ac. Q = 0.18 cfs
TQ = 34.48 cfs

POST DEVELOPED Q TO BASIN:

ONSITE: 7.58 ACRES x 3.26 cfs/ac. Q = 24.71 cfs
TQ = 24.71 cfs
(CFM = 1482.6)

BYPASS BASIN -
POST-DEVELOPED:

ONSITE: 8.83 ACRES x 3.26 cfs/ac. Q = 28.79 cfs
OFFSITE: 0.08 ACRES x 3.26 cfs/ac. Q = 0.26 cfs
TQ = 29.05 cfs

DETENTION REQUIRED:

$24.71 \text{ cfs} + 29.05 \text{ cfs} = 53.76 \text{ cfs} - 34.48 \text{ cfs} = 19.28 \text{ cfs}$
 $19.28 \text{ cfs} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 34,704 \text{ CU.FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$24.71 \text{ cfs} - 19.28 \text{ cfs} = 5.43 \text{ cfs}$

PEAK OUTFLOW = 3.8 @ 37 min.

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PROJECT NAME Hutchings Farm Ph. 2
PROJECT #/JOB ORDER # 95-234/34869
DATE Feb. 8, 1997
DESIGNER J. Kendrick
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25YR. / 20 MIN.

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*****
*
* RECTANGULAR ORIFICE
* 5 in W X 10 in H ELEV= 593
*
* Outlet Pipe - 160 ft - 24 in pipe
* UFL= 593 LFL= 589 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 60 in STANDPIPE ELEV= 599.2
*
*****
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HUTCHINGS FARM PHASE 2		2-8-97	SUBMITTAL DATE:		
MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	74.13	74.13	0.00	74.13	593.10
2	148.26	222.39	2.16	220.23	593.31
3	222.39	442.62	11.06	431.56	593.60
4	296.52	728.08	30.35	697.73	593.97
5	370.65	1068.38	76.08	992.30	594.10
6	444.78	1437.08	84.22	1352.86	594.23
7	518.91	1871.77	91.85	1779.92	594.38
8	593.04	2372.96	100.15	2272.81	594.56
9	667.17	2939.98	108.93	2831.05	594.76
10	741.30	3572.35	118.10	3454.25	594.98
11	815.43	4269.68	127.56	4142.12	595.23
12	889.56	5031.68	137.24	4894.44	595.50
13	963.69	5858.13	147.11	5711.02	595.79
14	1037.82	6748.84	157.11	6591.73	596.05
15	1111.95	7703.68	165.38	7538.30	596.19
16	1186.08	8724.38	169.98	8554.40	596.35
17	1260.21	9814.61	174.79	9639.82	596.52
18	1334.34	10974.16	179.79	10794.37	596.71
19	1408.47	12202.84	184.95	12017.89	596.90
20	1482.60	13500.49	190.27	13310.22	597.10
21	1408.47	14718.69	195.73	14522.96	597.29
22	1334.34	15857.30	200.73	15656.57	597.47
23	1260.21	16916.78	205.28	16711.50	597.63
24	1186.08	17897.58	209.43	17688.15	597.79
25	1111.95	18800.10	213.20	18586.90	597.93
26	1037.82	19624.72	216.61	19408.11	598.03
27	963.69	20371.80	219.14	20152.66	598.10
28	889.56	21042.22	220.78	20821.44	598.17
29	815.43	21636.87	222.24	21414.63	598.22
30	741.30	22155.93	223.53	21932.40	598.27
31	667.17	22599.57	224.65	22374.92	598.31
32	593.04	22967.96	225.60	22742.36	598.34
33	518.91	23261.27	226.39	23034.88	598.37
34	444.78	23479.66	227.01	23252.65	598.39
35	370.65	23623.30	227.48	23395.82	598.41
36	296.52	23692.34	227.78	23464.56	598.41
37	222.39	23686.95	227.93	23459.02	598.41
38	148.26	23607.28	227.92	23379.36	598.40
39	74.13	23453.49	227.75	23225.74	598.39
40	0.00	23225.74	227.42	22998.32	598.37

PEAK OUTFLOW= 3.8 CFS AT 37 MINUTES

PICKETT RAY & SILVER

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St. Peters, MD 21376

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PROJECT NAME Hutchings Farm Ph. 2
PROJECT #/JOB ORDER # 95-234/34860
DATE Feb. 8, 1997
DESIGNER J. Kendrick
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**BASIN @ LOT 315
STORMWATER DETENTION
DESIGN STORM: 100 YR. / 20 MIN.**

PRE-DEVELOPED CONDITIONS:

ONSITE: 14.85 AC. x 2.95 cfs/AC.
OFFSITE: 0.08 AC. x 2.95 cfs/AC.

Q = 43.81 cfs
Q = 0.24 cfs

TQ = 44.05 cfs

POST-DEVELOPED Q TO BASIN:

ONSITE: 7.58 AC. x 4.17 cfs/AC.

Q = 31.61 cfs

TQ = 31.61 cfs
(CFM = 1896.6)

BYPASS BASIN -
POST-DEVELOPED:

ONSITE: 8.83 AC. x 4.17 cfs/AC.
OFFSITE: 0.08 AC. x 4.17 cfs/AC.

Q = 36.82 cfs
Q = 0.33 cfs

TQ = 37.15 cfs

DETENTION REQUIRED:

$31.61 \text{ cfs} + 37.15 \text{ cfs} = 68.76 \text{ cfs} - 44.05 \text{ cfs} = 24.71 \text{ cfs}$

$24.71 \text{ cfs} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 44,478 \text{ CU. FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$31.61 \text{ cfs} - 24.71 \text{ cfs} = 6.90 \text{ cfs}$

PEAK OUTFLOW = 4.06 @ 38 min

PROJECT NAME Hutchings Farm Ph.2
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 DATE Feb. 8, 1997
 DESIGNER J. Kendrick
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PICKETT RAY & SILVER

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

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100YR./20MIN.

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*****
*
* RECTANGULAR ORIFICE
* 5 in W X 10 in H ELEV= 593
*
* Outlet Pipe - 160 ft - 24 in pipe
* UFL= 593 LFL= 589 n= .013
*
* Overflow Structure - Standpipe
* DIAM= 60 in STANDPIPE ELEV= 599.2
*
*****
  
```

HUTCHINGS FARM PHASE 2 2-8-97 SUBMITTAL DATE:

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	94.83	94.83	0.00	94.83	593.13
2	189.66	284.49	3.13	281.36	593.39
3	284.49	565.85	15.98	549.87	593.77
4	379.32	929.19	43.65	885.54	594.06
5	474.15	1359.69	81.83	1277.87	594.20
6	568.98	1846.85	90.32	1756.53	594.37
7	663.81	2420.34	99.71	2320.63	594.57
8	758.64	3079.27	109.75	2969.52	594.81
9	853.47	3822.99	120.27	3702.72	595.07
10	948.30	4651.02	131.14	4519.88	595.36
11	1043.13	5563.01	142.28	5420.73	595.69
12	1137.96	6558.69	153.63	6405.06	596.02
13	1232.79	7637.85	164.45	7473.40	596.18
14	1327.62	8801.02	169.67	8631.35	596.37
15	1422.45	10053.80	175.15	9878.65	596.56
16	1517.28	11395.93	180.87	11215.07	596.77
17	1612.11	12827.18	186.80	12640.38	597.00
18	1706.94	14347.32	192.92	14154.40	597.23
19	1801.77	15956.17	199.22	15756.95	597.48
20	1896.60	17653.55	205.68	17447.87	597.75
21	1801.77	19249.64	212.28	19037.36	598.00
22	1706.94	20744.30	218.30	20525.99	598.14
23	1612.11	22138.10	221.60	21916.51	598.27
24	1517.28	23433.79	224.62	23209.18	598.39
25	1422.45	24631.63	227.39	24404.24	598.50
26	1327.62	25731.86	229.92	25501.94	598.60
27	1232.79	26734.73	232.22	26502.51	598.69
28	1137.96	27640.47	234.30	27406.17	598.78
29	1043.13	28449.30	236.16	28213.14	598.85
30	948.30	29161.44	237.81	28923.63	598.92
31	853.47	29777.10	239.25	29537.85	598.98
32	758.64	30296.49	240.49	30056.00	599.03
33	663.81	30719.81	241.54	30478.27	599.07
34	568.98	31047.25	242.38	30804.87	599.10
35	474.15	31279.02	243.03	31035.99	599.12
36	379.32	31415.31	243.49	31171.82	599.13
37	284.49	31456.31	243.76	31212.55	599.13
38	189.66	31402.21	243.84	31158.37	599.13
39	94.83	31253.20	243.74	31009.46	599.11
40	0.00	31009.46	243.44	30766.02	599.09

PEAK OUTFLOW= 4.06 CFS AT 38 MINUTES

PICKETT RAY & SILVER

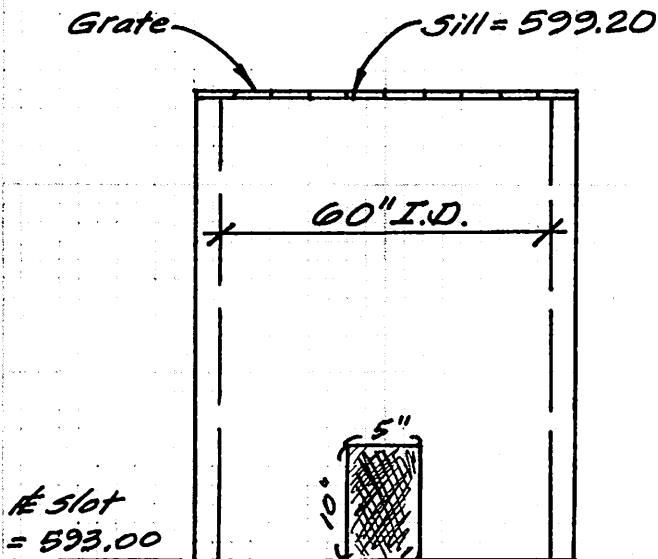
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PROJECT NAME Hutchings Farm Ph. 2
PROJECT #/JOB ORDER # 95-234 / 34869
DATE Feb. 8, 1997
DESIGNER J. Kendrick
PAGE 11 of 11.

ELEVATION	AREA	VOLUME	CUM. VOLUME
593.00	0		
594.00	1434	717	717
596.00	4146	5580	6297
598.00	8602	12748	19045
600.00	12865	21467	40512
602.00	17940	30805	71317
602.50	19536	9369	80686



OUTFALL STRUCTURE
N.T.S.

60" ϕ Standpipe w/ steel Grate
on Sill.

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

$$Q_{25} = C L H^{3/2}$$

$$24.71 = 3.0 \times 15.71 \times H^{3/2}$$

$$24.71 = 47.13 \times H^{3/2}$$

$$\left(\frac{24.71}{47.13}\right)^{2/3} = H$$

$$0.65' = H$$

Top Dam = 602.00
25YR. H.W. = 598.41
100YR. H.W. = 599.13
Freeboard_{25yr.}:

$$599.20 + 0.65 = 599.85$$

$$602.00 - 599.85 = \underline{2.15 \text{ Feet}}$$

Freeboard_{100yr.}:

$$599.20 + 0.77 = 599.97$$

$$602.00 - 599.97 = \underline{2.03 \text{ Feet}}$$

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PROJECT NAME HUTCHINGS FARM PHASE 2
PROJECT #/JOB ORDER # 95-234
DATE MARCH 7, 1998
DESIGNER J. KENDRICK
PAGE 1 OF 11.

LAKE @ PHASE TWO
STORMWATER DETENTION
DESIGN STORM: 2 YR./20MIN.

PRE-DEVELOPED CONDITIONS:

18.90 ACRES x 1.20 CFS/ACRE

$Q = 22.68 \text{ CFS}$

$T.Q. = 22.68 \text{ CFS}$

POST-DEVELOPED Q TO BASIN:

VIA F.E. 111-A: 6.64 ACRES x 1.67 CFS/ACRE

$Q = 11.09 \text{ CFS}$

VIA F.E. 2-32: 37.16 ACRES x 1.67 CFS/ACRE

$Q = 62.06 \text{ CFS}$

VIA F.E. 2-108: 1.06 ACRES x 1.67 CFS/ACRE

$Q = 1.77 \text{ CFS}$

DIRECT RUNOFF: 3.48 ACRES x 1.67 CFS/ACRE

$Q = 5.81 \text{ CFS}$

$T.Q. = 80.73 \text{ CFS}$
(CFM = 4,843.80)

BYPASS BASIN -
POST-DEVELOPED:

0.30 ACRES x 1.67 CFS/ACRE

$Q = 0.50 \text{ CFS}$

$T.Q. = 0.50 \text{ CFS}$

DETENTION REQUIRED:

$80.73 \text{ CFS} + 0.50 \text{ CFS} = 81.23 \text{ CFS} - 22.68 \text{ CFS} = 58.55 \text{ CFS}$

$58.55 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 105,390 \text{ CU. FT.}$
(VOLUME)

ALLOWABLE RELEASE:

$80.73 \text{ CFS} - 58.55 \text{ CFS} \quad Q = 22.18 \text{ CFS}$

PEAK OUTFLOW:

10.06 CFS @ 38 MIN.



PROJECT NAME HUTCHINGS FARM PHASE 2

PROJECT #/JOB ORDER # 95-234

DATE MARCH 7, 1998

DESIGNER J. KENDRICK

PAGE 2 OF 11

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397-1211

**LAKE @ PHASE TWO
STORMWATER DETENTION
DESIGN STORM: 2 YR. / 20 MIN.**

+
+ RECTANGULAR ORIFICE +
+ 12 in W X 24 in H ELEV= 554 +
+ +
+ Outlet Pipe - 40 ft - 42 in pipe +
+ UFL= 554 LFL= 553.2 n= .013 +
+ +
+ Overflow Structure - Box Structure +
+ PERIMETER= 19 ft/SILL ELEV= 558 +
+ +

HUTCHINGS FARM PHASE 2 3-8-98 SUBMITTAL DATE: 3-9-98

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	242.19	242.19	0.00	242.19	554.01
2	484.38	726.57	0.07	726.50	554.02
3	726.57	1453.07	0.34	1452.73	554.03
4	968.76	2421.49	0.97	2420.52	554.06
5	1210.95	3631.47	2.09	3629.38	554.08
6	1453.14	5082.52	3.84	5078.68	554.12
7	1695.33	6774.01	6.36	6767.65	554.16
8	1937.52	8705.17	9.78	8695.39	554.20
9	2179.71	10875.10	14.24	10860.86	554.25
10	2421.90	13282.76	19.89	13262.87	554.31
11	2664.09	15926.96	26.84	15900.12	554.37
12	2906.28	18806.40	35.22	18771.18	554.44
13	3148.47	21919.65	45.18	21874.47	554.51
14	3390.66	25265.13	56.84	25208.29	554.59
15	3632.85	28841.14	70.32	28770.82	554.67
16	3875.04	32645.86	85.74	32560.12	554.76
17	4117.23	36677.35	103.22	36574.13	554.85
18	4359.42	40933.55	122.88	40810.67	554.95
19	4601.61	45412.28	144.84	45267.44	555.06
20	4843.80	50111.24	169.20	49942.04	555.16
21	4601.61	54543.65	196.08	54347.57	555.27
22	4359.42	58706.99	222.58	58484.41	555.36
23	4117.23	62601.64	248.48	62353.16	555.45
24	3875.04	66228.21	273.54	65954.68	555.54
25	3632.85	69587.53	297.57	69289.96	555.62
26	3390.66	72680.61	320.44	72360.18	555.69
27	3148.47	75508.65	341.97	75166.68	555.75
28	2906.28	78072.96	362.05	77710.90	555.81
29	2664.09	80375.00	380.59	79994.40	555.87
30	2421.90	82416.30	397.49	82018.80	555.91
31	2179.71	84198.52	412.67	83785.85	555.95
32	1937.52	85723.38	426.07	85297.30	555.99
33	1695.33	86992.62	437.66	86554.96	556.02
34	1453.14	88008.10	592.09	87416.02	556.03
35	1210.95	88626.98	597.10	88029.88	556.05
36	968.76	88998.64	600.65	88397.98	556.05
37	726.57	89124.56	602.77	88521.78	556.06
38	484.38	89006.16	603.49	88402.68	556.05
39	242.19	88644.88	602.79	88042.08	556.05
40	0.00	88042.08	600.72	87441.36	556.03

PEAK OUTFLOW= 10.06 CFS AT 38 MINUTES

PROJECT NAME HUTCHINGS FARM PHASE 2
 PROJECT #/JOB ORDER # 95-234
 DATE MARCH 7, 1998
 DESIGNER J. KENDRICK
 PAGE 3 OF 11.

PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.
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**LAKE @ PHASE TWO
 STORMWATER DETENTION
 DESIGN STORM: 5 YR./20 MIN.**

PRE-DEVELOPED CONDITIONS:

18.90 ACRES X 1.51 CFS/ACRE

Q = 28.54 CFS

POST DEVELOPED Q TO BASIN:

T.Q. = 28.54 CFS

VIA F.E. 111A: 6.64 ACRES X 2.12 CFS/ACRE

Q = 14.07 CFS

VIA F.E. 2-32: 37.16 ACRES X 2.12 CFS/ACRE

Q = 78.78 CFS

VIA F.E. 2-108: 1.06 ACRES X 2.12 CFS/ACRE

Q = 2.25 CFS

DIRECT RUNOFF: 3.48 ACRES X 2.12 CFS/ACRE

Q = 7.38 CFS

T.Q. = 102.48 CFS
 (CFM = 6,148.80)

BYPASS BASIN -
 POST-DEVELOPED:

0.30 ACRES X 2.12 CFS/ACRE

Q = 0.64 CFS

T.Q. = 0.64 CFS

DETENTION REQUIRED:

$102.48 \text{ CFS} + 0.64 \text{ CFS} = 103.12 \text{ CFS} - 28.54 \text{ CFS} = 74.58 \text{ CFS}$

$74.58 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 134,244 \text{ CU. FT.}$
 (VOLUME)

ALLOWABLE RELEASE:

$102.48 \text{ CFS} - 74.58 \text{ CFS} \quad Q = 27.90 \text{ CFS}$

PEAK OUTFLOW:

12.01 CFS @ 38 MIN.

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PROJECT NAME HUTCHINGS FARM PHASE 2

PROJECT #/JOB ORDER # 95-234

DATE MARCH 7, 1998

DESIGNER J. KENDRICK

PAGE 4 OF 11

**LAKE @ PHASE TWO
STORMWATER-DETENTION
DESIGN STORM: 5 YR. / 20 MIN.**

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*****
*
* RECTANGULAR ORIFICE
* 12 in W X 24 in H ELEV= 554
*
* Outlet Pipe - 40 ft - 42 in pipe
* UFL= 554 LFL= 553.2 n= .013
*
* Overflow Structure - Box Structure
* PERIMETER= 19 ft/SILL ELEV= 558
*
*****

```

HUTCHINGS FARM PHASE 2 3-8-98 SUBMITTAL DATE: 3-9-98

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	307.44	307.44	0.00	307.44	554.01
2	614.88	922.32	0.09	922.23	554.02
3	922.32	1844.55	0.49	1844.06	554.04
4	1229.76	3073.82	1.39	3072.43	554.07
5	1537.20	4609.63	2.99	4606.64	554.11
6	1844.64	6451.28	5.49	6445.79	554.15
7	2152.08	8597.87	9.09	8588.78	554.20
8	2459.52	11048.30	13.99	11034.32	554.26
9	2766.96	13801.28	20.36	13780.92	554.32
10	3074.40	16855.32	28.42	16826.90	554.39
11	3381.84	20208.74	38.35	20170.40	554.47
12	3689.28	23859.68	50.33	23809.35	554.56
13	3996.72	27806.07	64.54	27741.53	554.65
14	4304.16	32045.69	81.18	31964.51	554.75
15	4611.60	36576.11	100.40	36475.71	554.85
16	4919.04	41394.75	122.39	41272.36	554.96
17	5226.48	46498.84	147.31	46351.53	555.08
18	5533.92	51885.46	175.32	51710.14	555.21
19	5841.36	57551.50	206.59	57344.91	555.34
20	6148.80	63493.71	241.26	63252.45	555.48
21	5841.36	69093.81	279.48	68814.33	555.60
22	5533.92	74348.25	317.14	74031.11	555.73
23	5226.48	79257.60	353.88	78903.71	555.84
24	4919.04	83822.75	389.39	83433.36	555.95
25	4611.60	88044.96	423.40	87621.56	556.04
26	4304.16	91925.72	598.30	91327.42	556.11
27	3996.72	95324.14	619.37	94704.78	556.18
28	3689.28	98394.06	637.96	97756.10	556.24
29	3381.84	101137.90	654.31	100483.60	556.30
30	3074.40	103558.00	668.59	102889.50	556.34
31	2766.96	105656.40	680.92	104975.50	556.39
32	2459.52	107435.10	691.44	106743.60	556.42
33	2152.08	108895.70	700.24	108195.40	556.45
34	1844.64	110040.10	707.39	109332.70	556.47
35	1537.20	110869.90	712.93	110157.00	556.49
36	1229.76	111386.70	716.91	110669.80	556.50
37	922.32	111592.10	719.39	110872.80	556.50
38	614.88	111487.60	720.37	110767.30	556.50
39	307.44	111074.70	719.86	110354.90	556.49
40	0.00	110354.90	717.88	109637.00	556.48

PEAK OUTFLOW= 12.01 CFS AT 38 MINUTES

PROJECT NAME HITCHINGS FARM PHASE 2
 PROJECT #/JOB ORDER # 95-234
 DATE MARCH 7, 1998
 DESIGNER J. KENDRICK
 PAGE 5 OF 11.

PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.
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LAKE @ PHASE TWO
 STORMWATER DETENTION
 DESIGN STORM: 15 YR./20 MIN.

PRE-DEVELOPED CONDITIONS:

18.90 ACRES x 1.87 CFS/ACRE

Q = 35.34 CFS

POST-DEVELOPED Q TO BASIN

T.Q. = 35.34 CFS

VIA F.E. 111A: 6.64 ACRES x 2.64 CFS/ACRE

Q = 17.53 CFS

VIA F.E. 2-32: 37.16 ACRES x 2.64 CFS/ACRE

Q = 98.10 CFS

VIA F.E. 2-108: 1.06 ACRES x 2.64 CFS/ACRE

Q = 2.80 CFS

DIRECT RUNOFF: 3.48 ACRES x 2.64 CFS/ACRE

Q = 9.19 CFS

T.Q. = 127.62 CFS
 (CFM = 7,657.20)

BYPASS BASIN -
POST-DEVELOPED:

0.30 ACRES x 2.64 CFS/ACRE

Q = 0.79 CFS

T.Q. = 0.79 CFS

DETENTION REQUIRED:

$127.62 \text{ CFS} + 0.79 \text{ CFS} = 128.41 \text{ CFS} - 35.34 \text{ CFS} = 93.07 \text{ CFS}$

$93.07 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 167,526 \text{ CU. FT.}$
 (VOLUME)

ALLOWABLE RELEASE:

$127.62 \text{ CFS} - 93.07 \text{ CFS} = Q = 34.55 \text{ CFS}$

PEAK OUTFLOW:

14 CFS @ 38 MIN.

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PROJECT NAME HUTCHINGS FARM PHASE 2

PROJECT #/JOB ORDER # 95-234

DATE MARCH 7, 1998

DESIGNER J. KENDRICK

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*LAKE @ PHASE TWO
STORMWATER DETENTION
DESIGN STORM: 15 YR. / 20 MIN.*

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|
| RECTANGULAR ORIFICE
| 12 in W X 24 in H
|
| Outlet Pipe - 40 ft - 42 in pipe
| UFL= 554 LFL= 553.2 n= .013
|
| Overflow Structure - Box Structure
| PERIMETER= 19 ft/SILL ELEV= 558
|
*****
    
```

HUTCHINGS FARM PHASE 2 3-8-98 SUBMITTAL DATE: 3-9-98

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	382.86	382.86	0.00	382.86	554.01
2	765.72	1148.58	0.13	1148.45	554.03
3	1148.58	2297.03	0.68	2296.35	554.05
4	1531.44	3827.79	1.93	3825.86	554.09
5	1914.30	5740.16	4.16	5736.00	554.13
6	2297.16	8033.16	7.63	8025.53	554.19
7	2680.02	10705.55	12.63	10692.92	554.25
8	3062.88	13755.80	19.43	13736.37	554.32
9	3445.74	17182.11	28.28	17153.83	554.40
10	3828.60	20982.43	39.47	20942.96	554.49
11	4211.46	25154.42	53.25	25101.18	554.59
12	4594.32	29695.50	69.87	29625.63	554.69
13	4977.18	34602.81	89.59	34513.22	554.80
14	5360.04	39873.26	112.65	39760.61	554.93
15	5742.90	45503.51	139.29	45364.22	555.06
16	6125.76	51489.98	169.75	51320.23	555.20
17	6508.62	57828.85	204.26	57624.60	555.34
18	6891.48	64516.08	243.01	64273.07	555.50
19	7274.34	71547.41	286.28	71261.13	555.66
20	7657.20	78918.35	334.21	78584.13	555.83
21	7274.34	85858.48	387.03	85471.44	555.99
22	6891.48	92362.92	438.99	91923.92	556.12
23	6508.62	98432.54	622.69	97809.86	556.24
24	6125.76	103935.60	654.60	103281.00	556.35
25	5742.90	109023.90	682.91	108341.00	556.45
26	5360.04	113701.10	708.10	112993.00	556.55
27	4977.18	117970.10	730.49	117239.70	556.63
28	4594.32	121834.00	750.34	121083.60	556.71
29	4211.46	125295.10	767.86	124527.20	556.78
30	3828.60	128355.90	783.23	127572.60	556.84
31	3445.74	131018.40	796.58	130221.80	556.89
32	3062.88	133284.70	808.01	132476.60	556.94
33	2680.02	135156.70	817.61	134339.10	556.97
34	2297.16	136636.20	825.47	135810.80	557.00
35	1914.30	137725.10	831.61	136893.50	557.03
36	1531.44	138424.90	836.10	137588.80	557.04
37	1148.58	138737.40	838.98	137898.40	557.05
38	765.72	138664.10	840.26	137823.90	557.04
39	382.86	138206.70	839.95	137366.80	557.04
40	0.00	137366.80	838.07	136528.70	557.02

PEAK OUTFLOW= 14 CFS AT 38 MINUTES

PROJECT NAME HUTCHINGS FARM PHASE 2
 PROJECT #/JOB ORDER # 95-234
 DATE MARCH 7, 1998
 DESIGNER J. KENDRICK
 PAGE 7 OF 11.

PICKETT RAY & SILVER

333 Mid Rivers Mall Dr.
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397-1211

LAKE @ PHASE TWO
STORMWATER DETENTION
DESIGN STORM: 25 YR. / 20 MIN.

PRE-DEVELOPED CONDITIONS:

18.90 ACRES X 2.31 CFS/ACRE

Q = 43.66 CFS

T.Q. = 43.66 CFS

POST-DEVELOPED Q TO BASIN:

VIA F.E. 111A: 6.64 ACRES X 3.26 CFS/ACRE

Q = 21.65 CFS

VIA F.E. 2-32: 37.16 ACRES X 3.26 CFS/ACRE

Q = 121.14 CFS

VIA F.E. 2-108: 1.06 ACRES X 3.26 CFS/ACRE

Q = 3.45 CFS

DIRECT RUNOFF: 3.48 ACRES X 3.26 CFS/ACRE

Q = 11.34 CFS

T.Q. = 157.58 CFS
 (CFM = 9,454.80)

BYPASS BASIN -
POST-DEVELOPED:

0.30 ACRES X 3.26 CFS/ACRE

Q = 0.98 CFS

T.Q. = 0.98 CFS

DETENTION REQUIRED:

$157.58 \text{ CFS} + 0.98 \text{ CFS} = 158.56 \text{ CFS} - 43.66 \text{ CFS} = 114.90 \text{ CFS}$

$114.90 \text{ CFS} \times 30 \text{ MIN.} \times 60 \text{ SEC./MIN.} = 206,820 \text{ CU. FT.}$
 (VOLUME)

ALLOWABLE RELEASE:

$157.58 \text{ CFS} - 114.90 \text{ CFS}$

Q = 42.68 CFS

PEAK OUTFLOW:

16.09 CFS @ 38 MIN.

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PROJECT NAME HUTCHINGS FARM PHASE 2

PROJECT #/JOB ORDER # 95-234

DATE MARCH 7, 1998

DESIGNER J. KENDRICK

PAGE 8 OF 11

*LAKE @ PHASE TWO
STORMWATER DETENTION
DESIGN STORM: 25 YR. / 20 MIN.*

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*
* RECTANGULAR ORIFICE
* 12 in W X 24 in H ELEV= 554
*
* Outlet Pipe - 40 ft - 42 in pipe
* UFL= 554 LFL= 553.2 n= .013
*
* Overflow Structure - Box Structure
* PERIMETER= 19 ft/SILL ELEV= 558
*
*****
    
```

HUTCHINGS FARM PHASE 2 3-8-98 SUBMITTAL DATE: 3-9-98

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	472.74	472.74	0.00	472.74	554.01
2	945.48	1418.22	0.18	1418.04	554.03
3	1418.22	2836.26	0.94	2835.32	554.07
4	1890.96	4726.28	2.65	4723.63	554.11
5	2363.70	7087.33	5.70	7081.63	554.17
6	2836.44	9918.07	10.47	9907.60	554.23
7	3309.18	13216.78	17.33	13199.45	554.31
8	3781.92	16981.37	26.64	16954.73	554.40
9	4254.66	21209.39	38.78	21170.61	554.49
10	4727.40	25898.01	54.12	25843.89	554.60
11	5200.14	31044.03	73.00	30971.04	554.72
12	5672.88	36643.92	95.76	36548.16	554.85
13	6145.62	42693.78	122.76	42571.02	554.99
14	6618.36	49189.38	154.32	49035.06	555.14
15	7091.10	56126.16	190.77	55935.39	555.30
16	7563.84	63499.23	232.41	63266.82	555.48
17	8036.58	71303.40	279.57	71023.83	555.66
18	8509.32	79533.15	332.54	79200.61	555.85
19	8982.06	88182.68	391.58	87791.10	556.04
20	9454.80	97245.90	599.27	96646.64	556.22
21	8982.06	105628.70	648.40	104980.30	556.39
22	8509.32	113489.60	691.47	112798.10	556.54
23	8036.58	120834.70	729.56	120105.20	556.69
24	7563.84	127669.00	763.45	126905.60	556.83
25	7091.10	133996.70	793.68	133203.00	556.95
26	6618.36	139821.40	820.69	139000.70	557.07
27	6145.62	145146.30	844.79	144301.50	557.17
28	5672.88	149974.40	866.24	149108.10	557.27
29	5200.14	154308.30	885.24	153423.00	557.36
30	4727.40	158150.40	901.95	157248.50	557.43
31	4254.66	161503.10	916.52	160586.60	557.50
32	3781.92	164368.60	929.04	163439.50	557.56
33	3309.18	166748.70	939.61	165809.10	557.61
34	2836.44	168645.50	948.30	167697.20	557.64
35	2363.70	170060.90	955.16	169105.70	557.67
36	1890.96	170996.70	960.26	170036.40	557.69
37	1418.22	171454.70	963.61	170491.10	557.70
38	945.48	171436.50	965.24	170471.30	557.70
39	472.74	170944.00	965.17	169978.90	557.69
40	0.00	169978.90	963.40	169015.40	557.67

PEAK OUTFLOW= 16.09 CFS AT 38 MINUTES

PROJECT NAME HUTCHINGS FARM PHASE 2
 PROJECT #/JOB ORDER # 95-234
 DATE MARCH 7, 1998
 DESIGNER J. KENDRICK
 PAGE 9 OF 11.

PICKETT RAY & SILVER

333 Mid Rivers Mall Dr
 St. Peters, MO 63376

Civil Engineers
 Planners
 Land Surveyors

397-1211

**LAKE @ PHASE TWO
 STORMWATER DETENTION
 DESIGN STORM: 100YR. / 20MIN.**

PRE-DEVELOPED CONDITIONS:

18.90 ACRES X 2.95 CFS/ACRE

Q = 55.76 CFS

T.Q. = 55.76 CFS

POST-DEVELOPED Q TO BASIN:

VIA F.E. 111A: 6.64 ACRES X 4.17 CFS/ACRE
 VIA F.E. 2-32: 37.16 ACRES X 4.17 CFS/ACRE
 VIA F.E. 2-10B: 1.86 ACRES X 4.17 CFS/ACRE
 DIRECT RUNOFF: 3.48 ACRES X 4.17 CFS/ACRE

Q = 27.69 CFS

Q = 154.96 CFS

Q = 4.42 CFS

Q = 14.51 CFS

T.Q. = 201.58 CFS
 (CFM = 12,094.80)

BYPASS BASIN -
 POST-DEVELOPED:

0.30 ACRES X 4.17 CFS/ACRE

Q = 1.25 CFS

T.Q. = 1.25 CFS

DETENTION REQUIRED:

201.58 CFS + 1.25 CFS = 202.83 CFS - 55.76 CFS = 147.07 CFS

147.07 CFS X 30 MIN. X 60 SEC./MIN. = 264,726 CU. FT.
 (VOLUME)

ALLOWABLE RELEASE:

201.58 CFS - 147.07 CFS

Q = 54.51 CFS

PEAK OUTFLOW:

36.88 CFS @ 37 MIN.

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PROJECT NAME HUTCHINGS FARM PHASE 2
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*LAKE @ PHASE TWO
STORMWATER-DETENTION
DESIGN STORM: 100 YR. / 20 MIN.*

*
* RECTANGULAR ORIFICE *
* 12 in W X 24 in H ELEV= 554 *
*
* Outlet Pipe - 40 ft - 42 in pipe *
* UFL= 554 LFL= 553.2 n= .013 *
*
* Overflow Structure - Box Structure *
* PERIMETER= 19 ft/SILL ELEV= 558 *
*

HUTCHINGS FARM PHASE 2 3-8-98 SUBMITTAL DATE: 3-9-98

MIN	INFLOW	STORAGE	OUTFLOW	NET DET.	ELEV.
1	604.74	604.74	0.00	604.74	554.01
2	1209.48	1814.22	0.26	1813.96	554.04
3	1814.22	3628.18	1.36	3626.82	554.08
4	2418.96	6045.78	3.84	6041.94	554.14
5	3023.70	9065.64	8.25	9057.39	554.21
6	3628.44	12685.83	15.15	12670.68	554.30
7	4233.18	16903.86	25.06	16878.81	554.39
8	4837.92	21716.73	38.52	21678.21	554.51
9	5442.66	27120.87	56.08	27064.80	554.63
10	6047.40	33112.20	78.22	33033.98	554.77
11	6652.14	39686.12	105.48	39580.64	554.92
12	7256.88	46837.52	138.34	46699.18	555.09
13	7861.62	54560.80	177.30	54383.51	555.27
14	8466.36	62849.87	222.81	62627.06	555.46
15	9071.10	71698.16	275.35	71422.81	555.67
16	9675.84	81098.66	335.35	80763.31	555.88
17	10280.58	91043.90	403.22	90640.66	556.10
18	10885.32	101526.00	615.51	100910.50	556.30
19	11490.06	112400.50	670.79	111729.80	556.52
20	12094.80	123824.60	724.48	123100.10	556.75
21	11490.06	134590.10	776.90	133813.20	556.96
22	10885.32	144698.60	823.26	143875.30	557.17
23	10280.58	154155.90	864.53	153291.40	557.35
24	9675.84	162967.20	901.45	162065.70	557.53
25	9071.10	171136.80	934.53	170202.30	557.69
26	8466.36	178668.70	964.21	177704.50	557.84
27	7861.62	185566.10	990.77	184575.30	557.98
28	7256.88	191832.20	1014.49	190817.70	558.09
29	6652.14	197469.80	1122.07	196347.80	558.19
30	6047.40	202395.20	1312.24	201082.90	558.27
31	5442.66	206525.60	1520.36	205005.20	558.34
32	4837.92	209843.20	1713.96	208129.20	558.40
33	4233.18	212362.40	1892.28	210470.10	558.44
34	3628.44	214098.50	2027.41	212071.10	558.47
35	3023.70	215094.80	2143.93	212950.90	558.48
36	2418.96	215369.80	2198.77	213171.10	558.49
37	1814.22	214985.30	2212.61	212772.70	558.48
38	1209.48	213982.20	2187.60	211794.60	558.46
39	604.74	212399.30	2126.70	210272.60	558.43
40	0.00	210272.60	2015.71	208256.90	558.40

PEAK OUTFLOW= 36.88 CFS AT 37 MINUTES

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PROJECT NAME HUTCHINGS FARM PHASE 2

PROJECT #/JOB ORDER # 95-234

DATE MARCH 7, 1998

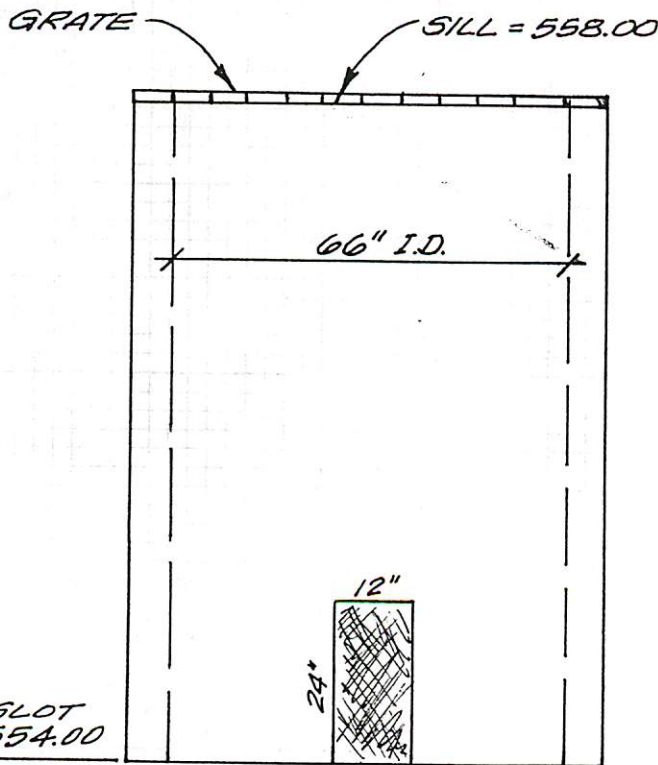
DESIGNER J. KENDRICK

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*LAKE @ PHASE TWO
STORMWATER DETENTION*

STORAGE VOLUME:

ELEVATION	AREA	VOLUME	CUM. VOLUME
554.00	39466		
556.00	46295	85761	85761
558.00	53388	99683	185444
560.00	60864	114252	299696
561.00	65461	63162	362858



*EMERGENCY
SPILLWAY -
CHECK LOWFLOW BLOCKED:*

$$Q_{25} = C \times L \times H^{3/2}$$

$$Q_{25} = 3 \times 55 \times 1^{3/2}$$

$$165 \text{ cfs} = Q_{25} \text{ CAP. @ 1' HIGH}$$

$$\text{TOP DAM} = 560.50$$

$$\text{TOP EMERGENCY SPILLWAY} = 558.50$$

$$25 \text{ YR. H.W.} = 557.70$$

$$100 \text{ YR. H.W.} = 558.49$$

$$\text{FREEBOARD}_{25 \text{ YR.}} = 2.80 \text{ FT.}$$

$$\text{FREEBOARD}_{100 \text{ YR.}} = 2.01 \text{ (H.W.)}$$

$$\text{FREEBOARD @ SPILLWAY} = 1 \text{ FT. @ TOP DAM}$$

*OUTFALL STRUCTURE
66" x 48" CONCRETE BOX
W/STEEL GRATE ON SILL.
N.T.S.*