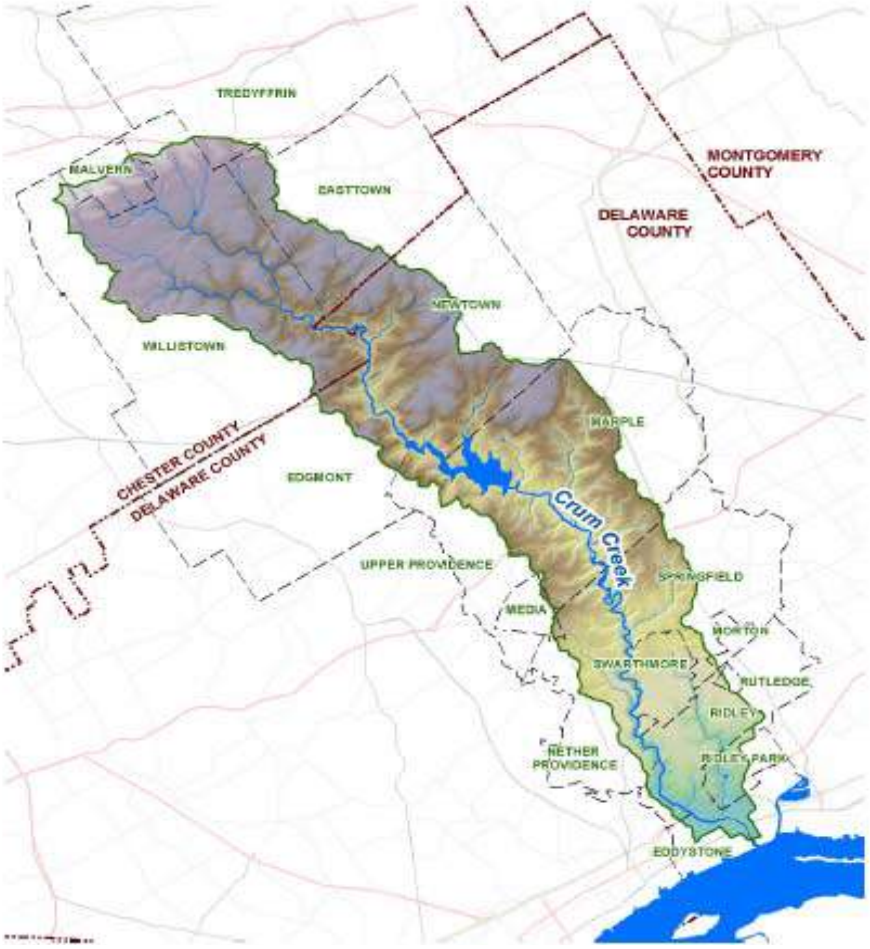
CRUM CREEK WATERSHED ACT 167 STORMWATER MANAGEMENT PLAN



VOLUME III
TECHNICAL APPENDIX

CHESTER AND DELAWARE COUNTIES, PENNSYLVANIA

DECEMBER 2011

CRUM CREEK WATERSHED ACT 167
STORMWATER MANAGEMENT PLAN

CHESTER AND DELAWARE COUNTIES, PENNSYLVANIA

VOLUME III
TECHNICAL APPENDIX

December 2011

DEP DOCUMENT # GRN100021546
FILE NO. SWMP 084-23
BLE PROJECT NO. 2004-1553-00

PREPARED BY:

DELAWARE COUNTY PLANNING DEPARTMENT
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201 West Front Street
Media, PA 19063-2751

and

CHESTER COUNTY PLANNING COMMISSION
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P.O. Box 2747
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ENGINEERING CONSULTANT:

Borton-LAWSON ENGINEERING, INC.
3893 Adler Place, Suite 100
Bethlehem, PA 18017

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Christine Fizzano Cannon, Vice Chairman
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John C, Washington, III

ENGINEERING CONSULTANT
Borton-Lawson Engineering, Inc.

CRUM CREEK WATERSHED DESIGNATED WPAC MEMBERS
As of October 10, 2007

Delaware County

Delaware County Planning Department	Ms. Karen Holm Manager, Environmental Section
Delaware County Conservation District	Mr. Edward Magargee District Manager
Eddystone Borough	Ms. Francine Howat Manager
Edgmont Township	Ms. Samantha Reiner Manager
Marple Township	Mr. Anthony Hamaday Manager
	Mr. Joseph Flicker Manager (former)
Media Borough	Mr. Jeffrey Smith Manager
Morton Borough	Ms. Delores Giardina Council Member
Nether Providence Township	Mr. Jonathan Sutton EAC Chairman
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Ridley Township	Mr. Charles J. Catania, Jr. Municipal Engineer
Ridley Park Borough	Ms. Terry Bradley Manager
Rutledge Borough	Mr. Edward O. McGaughey Manager

Springfield Township	Mr. Michael T. LeFevre Manager
Swarthmore Borough	Ms. Nancy Crickman EAC Member Alternate: Ms. Jane Billings
Upper Providence Township	Mr. Anthony Hamaday Manager (former)

Chester County

Chester County Planning Commission	Ms. Carrie Conwell Environmental/Open Space Planner
Chester County Conservation District	Mr. Dan Greig District Manager
Easttown Township	Mr. Dave Burman Assistant Manager
Malvern Borough	Ms. Sandra L Kelley Manager
Tredyffrin Township	Mr. Stephen Burgo, P.E. Municipal Engineer
Willistown Township	Mr. Hugh J. Murray, Sr. Manager

Others

Chester County Water Resources Authority	Ms. Janet Bowers Director
Chester Ridley Crum Watersheds Association	Mr. Gary Snyder President Alternate: Ms. Anne Murphy
Natural Resources Conservation Service (NRCS)	Mr. Sam High District Conservationist
Aqua Pennsylvania	Mr. Preston Luitweiler Alternate: Craig Marleton

VOLUME III – TECHNICAL APPENDIX

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A. WATERSHED PEAK FLOWS SUMMARY TABLES

CRUM CREEK

ACT 167 SUMMARY FLOW TABLES

Subbasin	HMS Element	Subarea DA	EXISTING CONDITIONS SUBAREA FLOWS					
			2- Yr	5- Yr	10- Yr	25- Yr	50- Yr	100- Yr
50	50	1 08	290.13	482.40	629.93	830 38	908 79	1010 07
51	51	1.97	375 03	609.97	867.96	820 99	1072.95	1357 39
52	52	1.59	293.29	474 27	506 57	608 35	799.68	1016 73
53	53	0.75	143.98	233.69	246.25	291 28	388.24	499.26
54	54	1.41	189 10	320 24	427.91	569 28	728 00	884 37
55	55	1.09	203.72	334 60	345 87	406 14	547.25	710 35
56	56	0 45	125.48	213 95	287.06	396 79	491.28	597.97
57	57	1.45	213 35	372.24	406.49	500 81	675 59	876.75
58	58	1 34	393.93	632.30	640 85	688 01	929.45	1205.40
59	59	0 69	186 54	271 39	284 53	340.78	454.43	583.80
60	60	2.04	173.71	675 30	763.37	976.84	1316 90	1708.25
61	61	1 95	564 56	1080 52	1236 13	1571.34	2018.72	2525 41
62	62	1 17	273 89	442 45	496.75	620 12	800 51	1004 43
63	63	1.61	377 92	600 19	680.03	851.03	1081 96	1339 64
64	64	0 75	98.80	195 78	249 19	348 19	453 70	579 23
65	65	2.96	968 21	1740 03	2556.34	3666 52	4464 07	5360 38
66	66	2.79	302.19	622 34	728.06	883 80	1174 64	1509 10
67	67	1 07	207.31	341.04	364.97	441 69	587.17	754.56
68	68	2 30	594 61	945 41	1129.31	1455 46	1817 09	2222 39
69	69	1.27	344.31	542.62	610 29	762.11	966.51	1193 28
70	70	1 39	482.65	784.94	859 05	1058 84	1284.43	1752 19
71	71	0 91	301 95	471 21	583 18	759 55	927 65	1114 97
72	72	0.87	183.28	291 30	376 60	383 91	497.59	625.12
73	73	0 84	214 66	338 07	374 89	463 44	593.16	737.67
74	74	0.32	90.55	137 91	165.24	210.99	258 22	310 72
75	75	1.27	242 80	376 73	551 29	811 25	968.17	1143 32
76	76	0.42	249 40	372 02	457.61	585 64	698.90	823.04
77	77	1.20	170.60	299 97	427.50	607 57	735 51	875 49
78	78	1.10	377.25	573 29	643 60	800 94	990.31	1194 32
79	79	0.25	124 71	174 73	196.79	241 84	299 19	366 30

CRUM CREEK
ACT 167 SUMMARY FLOW TABLES

Subbasin	HMS Element	Cumulative DA	EXISTING CONDITIONS CUMULATIVE FLOWS					
			2- Yr	5- Yr	10- Yr	25- Yr	50- Yr	100- Yr
62	1	16 90	1,423	2,372	2,987	3,812	4,393	5 451
79	101	34 65	1,336	2,440	3,014	4,035	5,248	6,599
77	102	3.37	591	960	1,364	1,952	2,367	2 815
56	103	6.47	897	1,450	1.591	1,935	2,501	3.145
US 60*	104	9.73	1 193	1.940	2.190	2,686	3,448	4,311
50	105	1.08	290	482	630	830	809	1,010
58	106	1 34	394	633	841	988	929	1,205
51	11	3 04	618	1 014	1,129	1 399	1,817	2,289
52	12	5 39	840	1,393	1,497	1,825	2,363	2,973
54&56	13	1 89	228	38'	507	696	959	1,042
57	14	3 32	425	730	800	1,'69	1,498	1,879
60	15	11.82	1,260	2,087	2,352	2,900	3,719	4,646
59	16	13 85	1,329	2,194	2,482	3,057	3,935	5.002
61	17	15 60	1,383	2,285	2,598	3,163	4,142	5 253
66	18	26.14	1.355	2,420	2,854	3,65'	4,745	5,965
68	19	28.44	1.253	2.313	2,804	3,697	4,834	6 038
69&70	20	31.10	1,266	2,383	2,097	3,630	4,999	6 300
72&73	21	32 81	1,318	2,450	2,963	5 925	5,115	6 445
7'	22	0 91	302	471	583	760	928	1 1 15
74	23	33 13	1,328	2,442	2,979	3 948	5,145	6 476
75	24	2 18	452	706	1.026	1 521	1 037	2.' 86
76	25	35 95	1,335	2,449	2,995	3 974	5 174	6,510
63	3	1 61	378	600	680	851	1 082	1,340
64&65	7	22 29	1,294	2,320	2.679	3 397	4 420	5.558
US 70*	9	38 02	1,678	2,582	3,525	5.'00	6 338	7,767

*Note: The HMS Element is located upstream of the subbasin listed. All other HMS elements are directly downstream of the subasin(s) listed.

B. HEC-HMS MODEL OUTPUT TABLES

Project: Final_Crum_Creek Simulation Run: 1-yr

Start of Run: 15May2006, 00:00 Basin Model: Crum 2-yr OK
End of Run: 17May2006, 00:05 Meteorologic Model: 1-YR
Compute Time: 22Aug2007, 11:24:36 Control Specifications: Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	792.95	15May2006, 17:20	873.67
10	38.2700	990.35	15May2006, 16:25	1867.92
101	34.6500	767.40	16May2006, 04:25	1604.03
102	3.3730	312.50	15May2006, 14:05	221.29
103	6.4660	485.61	15May2006, 15:35	352.05
104	9.7830	640.75	15May2006, 15:25	522.89
105	1.0750	147.34	15May2006, 13:00	62.88
106	1.3390	206.07	15May2006, 12:40	68.32
11	3.0410	325.74	15May2006, 13:15	155.62
12	5.3790	451.26	15May2006, 14:50	291.03
13	1.8550	116.89	15May2006, 14:10	107.89
14	3.3170	209.04	15May2006, 14:00	170.84
15	11.8230	687.98	15May2006, 15:35	594.47
16	13.8540	733.28	15May2006, 16:20	713.33
17	15.8030	766.98	15May2006, 16:50	805.43
18	26.1380	742.13	15May2006, 22:00	1170.70
19	28.4420	703.77	16May2006, 01:30	1195.37
20	31.0970	723.56	16May2006, 01:35	1346.00
21	32.8100	745.22	16May2006, 01:35	1461.58
22	0.9090	171.84	15May2006, 12:55	67.95
23	33.1290	753.90	16May2006, 01:45	1501.53
24	2.1760	255.10	15May2006, 13:25	155.28
25	33.5490	770.53	15May2006, 13:55	1551.24
27	26.1380	740.06	15May2006, 23:30	1154.65
28	28.4420	703.40	16May2006, 02:00	1189.25

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	723.25	16May2006, 02:10	1337.81
3	1.6080	209.02	15May2006, 13:25	91.32
30	32.8100	745.10	16May2006, 01:50	1458.07
31	0.9090	167.97	15May2006, 13:15	67.95
32	33.1290	753.78	16May2006, 02:00	1498.15
33	2.1760	250.48	15May2006, 14:00	155.28
34	33.5490	759.65	16May2006, 04:25	1516.16
35	16.9760	789.39	15May2006, 18:20	873.67
37	1.6080	204.41	15May2006, 14:00	91.32
41	22.2940	697.99	15May2006, 22:05	1039.34
42	38.0230	972.55	15May2006, 16:25	1820.33
43	3.0410	299.70	15May2006, 15:05	155.62
44	9.7830	638.98	15May2006, 15:40	522.89
45	1.8550	116.32	15May2006, 14:35	107.89
46	5.3790	443.22	15May2006, 15:40	291.03
47	11.8230	661.78	15May2006, 16:20	594.47
48	13.8540	729.62	15May2006, 16:55	713.33
49	15.8030	764.67	15May2006, 17:25	805.43
50	1.0750	147.34	15May2006, 13:00	62.88
51	1.9660	201.46	15May2006, 13:35	92.74
52	1.5900	158.38	15May2006, 13:50	83.24
53	0.7480	78.29	15May2006, 13:30	52.17
54	1.1050	94.06	15May2006, 14:20	67.03
55	1.0870	108.39	15May2006, 13:25	61.02
56	0.4500	61.99	15May2006, 12:45	40.86
57	1.1620	100.64	15May2006, 13:45	62.95
58	1.3390	206.07	15May2006, 12:40	68.32
59	0.6920	90.01	15May2006, 13:05	50.54
60	2.0400	154.90	15May2006, 13:10	71.59
61	1.9460	358.10	15May2006, 12:35	92.10
62	1.1730	149.00	15May2006, 13:10	68.24
63	1.6080	209.02	15May2006, 13:25	91.32

Hycrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	36.62	15May2006, 13:40	41.67
65	2.9560	406.91	15May2006, 12:30	99.69
66	2.7790	100.49	15May2006, 13:55	71.83
67	1.0650	110.64	15May2006, 13:20	59.53
68	2.3040	329.63	15May2006, 13:10	116.62
69	1.2650	191.94	15May2006, 13:15	80.97
7	27.2940	701.22	15May2006, 19:55	1060.82
70	1.3890	258.61	15May2006, 12:35	75.78
71	0.9090	171.84	15May2006, 12:55	67.95
72	0.6700	101.61	15May2006, 13:40	51.49
73	0.8430	119.87	15May2006, 13:20	62.28
74	0.3190	54.02	15May2006, 13:20	43.46
75	1.2670	137.13	15May2006, 14:35	87.33
76	0.4200	150.50	15May2006, 12:30	53.09
77	0.1970	74.99	15May2006, 15:00	66.00
78	0.1010	215.03	15May2006, 13:20	87.87
79	0.2470	80.44	15May2006, 13:05	47.59
9	38.0230	978.23	15May2006, 16:10	1825.32
Crum Dam 23-020	26.4420	703.77	15May2006, 01:30	1195.37
Geist 23-079	22.2940	701.22	15May2006, 19:55	1060.82

Project: Final_Crum_Creek Simulation Run 2-yr

Start of Run: 15May2006, 00:00 Basin Model: Crum 2-yr
End of Run: 17May2006, 00:05 Meteorologic Model: 2-YR
Compute Time: 22Aug2007, 11:21:36 Control Specifications: Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
*	16.9760	1452.49	15May2006, 17:10	1324.40
*0	38.2700	1690.81	15May2006, 16:25	2937.89
101	34.6500	1386.77	16May2006, 04:05	2548.96
102	3.3730	591.23	15May2006, 14:05	336.53
103	6.4660	897.09	15May2006, 15:35	530.88
104	9.7830	1193.08	15May2006, 15:20	785.97
105	1.0750	290.13	15May2006, 12:55	93.88
106	1.3390	393.93	15May2006, 12:40	102.99
1*	3.0410	617.85	*5May2006, 13:10	240.77
12	5.3790	839.82	15May2006, 14:45	441.75
13	1.8550	227.88	15May2006, 14:00	*56.59
14	3.3170	425.18	15May2006, 13:50	255.10
15	11.8230	1282.81	15May2006, 15:30	907.08
16	13.8540	1354.28	15May2006, 16:10	1079.00
17	15.8030	*410.02	15May2006, 16:45	1223.58
18	26.1380	1412.35	15May2006, 21:35	1858.67
19	28.4420	1301.21	16May2006, 00:50	1946.44
20	31.0970	1336.95	16May2006, 00:50	2176.26
2*	32.8100	1369.10	16May2006, 0*:15	2343.58
22	0.9090	301.95	15May2006, 12:55	97.12
23	33.*290	1378.86	16May2006, 0*:30	2393.45
24	2.1760	451.80	15May2006, 13:25	229.39
25	33.5490	1386.04	16May2006, 01:40	2458.42
27	26.1380	1405.25	15May2006, 23:05	1841.91
28	28.4420	*300.19	16May2006, 01:15	1939.65

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	1335.46	16May2006, 01:25	2167.11
3	1.6080	377.92	15May2006, 13:25	140.93
30	32.6100	1368.43	16May2006, 01:30	2339.63
31	0.9090	294.96	15May2006, 13:10	97.12
32	33.1290	1378.21	16May2006, 01:45	2389.65
33	2.1760	442.91	15May2006, 14:00	229.39
34	33.5490	1378.69	16May2006, 04:05	2417.82
36	15.9760	1449.34	15May2006, 18:05	1324.40
37	1.6080	369.19	15May2006, 14:00	140.93
41	22.2940	1338.73	15May2006, 21:35	1635.51
42	38.0230	1667.79	15May2006, 16:25	2879.57
43	3.0410	566.23	15May2006, 15:00	240.77
44	9.7830	1189.84	15May2006, 15:35	785.97
45	1.8550	226.77	15May2006, 14:25	156.59
46	5.3790	823.45	15May2006, 15:35	441.75
47	11.8230	1272.58	15May2006, 16:15	907.08
48	13.8640	1349.03	15May2006, 16:45	1079.00
49	15.8030	1407.06	15May2006, 17:15	1223.58
50	1.0760	290.13	15May2006, 12:55	93.88
51	1.9660	375.03	15May2006, 13:35	146.89
52	1.5900	293.29	15May2006, 13:45	128.97
53	0.7480	143.98	15May2006, 13:30	72.01
54	1.4050	189.10	15May2006, 14:15	104.26
55	1.0870	203.72	15May2006, 13:25	89.13
56	0.4500	125.48	15May2006, 12:40	52.30
57	1.4620	213.35	15May2006, 13:40	98.51
58	1.3390	393.93	15May2006, 12:40	102.99
59	0.6920	166.54	15May2006, 13:00	66.93
60	2.0400	368.79	15May2006, 13:05	121.11
61	1.9490	664.66	15May2006, 12:35	144.58
62	1.1730	273.89	15May2006, 13:10	100.81
63	1.6080	377.92	15May2006, 13:25	140.93

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	98.80	15May2006, 13:30	59.60
65	2.9560	968.21	15May2006, 12:30	179.31
66	2.7790	302.19	15May2006, 13:40	136.92
67	1.0660	207.31	15May2006, 13:15	86.24
68	2.3040	594.61	15May2006, 13:10	185.61
69	1.2660	344.31	15May2006, 13:15	121.64
7	22.2940	1349.82	15May2006, 19:30	1657.63
70	1.3890	482.55	15May2006, 12:35	114.97
71	0.9090	301.95	15May2006, 12:55	97.12
72	0.8700	183.28	15May2006, 13:40	87.85
73	0.8430	214.66	15May2006, 13:20	88.62
74	0.3190	90.55	15May2006, 13:20	53.83
75	1.2670	242.80	15May2006, 14:30	132.27
76	0.4200	249.40	15May2006, 12:30	68.78
77	1.1970	170.60	15May2006, 14:50	107.14
78	1.1010	377.28	15May2006, 13:20	131.13
79	0.2470	124.11	15May2006, 13:05	58.32
9	38.0230	1678.14	15May2006, 16:05	2885.49
Crum Dam 23-020	28.4420	1301.21	16May2006, 00:50	1946.44
Geist 23-079	22.2940	1349.82	15May2006, 19:30	1657.63

Project: Final_Crum_Creek Simulation Run: 5-yr

Start of Run:	15May2006, 00:00	Basin Model:	Crum 2-yr
End of Run:	17May2006, 00:05	Meteorologic Model:	5-YR
Compute Time:	17Aug2007, 09:07:37	Control Specifications:	Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC FT)
1	16.9760	2371.61	15May2006, 16:00	1935.44
10	38.2700	2604.14	15May2006, 16:25	4376.45
101	34.6500	2440.47	16May2006, 03:30	3827.63
102	3.3730	959.58	15May2006, 14:05	484.56
103	6.4660	1450.10	15May2006, 15:30	770.40
104	9.7830	1940.01	15May2006, 15:20	1141.64
105	1.0750	482.40	15May2006, 12:55	135.32
106	1.3390	651.89	15May2006, 12:40	150.02
11	3.0410	1014.17	15May2006, 13:10	354.65
12	5.3790	1362.99	15May2006, 14:45	643.13
13	1.8550	381.30	15May2006, 13:55	223.19
14	3.3170	729.58	15May2006, 13:45	371.24
15	11.8230	2086.53	15May2006, 15:30	1332.46
16	13.8540	2794.17	15May2006, 16:05	1575.22
17	15.8030	2284.90	15May2006, 15:35	1791.15
18	26.1380	2419.86	16May2006, 21:05	2799.59
19	28.4420	2313.38	16May2006, 00:00	2972.64
20	31.0970	2383.28	16May2006, 00:20	3306.67
21	32.8100	2429.98	16May2006, 00:50	3542.02
22	0.9090	471.21	15May2006, 12:55	134.77
23	33.1290	2441.75	16May2006, 01:05	3604.85
24	2.1760	706.37	15May2006, 13:25	323.87
25	33.5490	2449.36	16May2006, 01:15	3688.88
27	26.1380	2410.44	15May2006, 22:35	2782.15
28	28.4420	2310.92	16May2006, 00:25	2965.26

Hycrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	2378.73	16May2006, 00 55	3296.66
3	1.6080	600.19	15May2006, 13 25	205.66
30	32.8100	2428.29	16May2006, 01 05	3537.68
31	0.9090	460 43	15May2006, 13.10	134.77
32	33.1290	2440 38	16May2006. 01.15	3600.65
33	2.1760	692 06	15May2006. 13:55	323.87
34	33.5490	2431 32	16May2006, 03:30	3643.33
36	16.9760	2363.29	15May2006, 17:10	1835.44
37	1.6080	585 92	15May2006, 14:00	205 66
41	22.2940	2305.57	15May2006, 21:10	2445 22
42	38.0230	2575.17	15May2006, 16:25	4305 42
43	3.0410	926.69	15May2006, 15:00	354 65
44	9.7830	1934 16	15May2006, 15:35	1141.64
45	1.8550	379.37	15May2006. 14:25	223 19
46	5.3790	1336 02	15May2006, 15:35	643 13
47	11.8230	2072 46	15May2006, 16:10	1332.46
48	13.8540	2166 23	15May2006, 16:40	1576 22
49	15.8030	2281.29	15May2006, 16:10	1791 15
50	1.0750	482 40	15May2006, 12:55	135.32
51	1.9660	609.91	15May2006, 13:30	219.32
52	1.5900	474.27	15May2006, 13:45	169 69
53	0.7480	233.59	15May2006, 13:30	98 79
54	1 4050	320.24	15May2006, 14:15	155 11
55	1 0870	334.60	15May2006, 13:25	127 27
56	0 4500	213.95	15May2006, 12:40	68.09
57	1 4620	372 24	15May2006. 13:35	148.05
58	1 3390	667 89	15May2006. 12:40	150.02
59	0 6920	271.39	15May2006, 13:00	93.74
60	2 0400	675.30	15May2006. 13:00	190.82
61	1 9490	1080.52	15May2006, 12 35	214.93
62	1 1730	442.45	15May2006, 13 10	144.29
63	1.6080	600.19	15May2006, 13 25	205.66

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	196.78	15May2006, 13:25	85.58
65	2.9560	1746.03	15May2006, 12:25	288.92
66	2.7790	622.34	15May2006, 13:40	231.73
67	1.0650	341.04	15May2006, 13:15	122.64
68	2.3040	945.41	15May2006, 13:10	276.03
69	1.2660	542.62	15May2006, 13:15	174.26
7	22.2940	2320.31	15May2006, 19:10	2467.96
70	1.3890	784.94	15May2006, 12:35	167.16
71	0.9090	471.21	15May2006, 12:55	134.77
72	0.8700	291.30	15May2006, 13:40	122.44
73	0.8430	338.97	15May2006, 13:20	122.91
74	0.3190	137.91	15May2006, 13:20	67.17
75	1.2670	376.73	15May2006, 14:30	189.09
76	0.4200	372.02	15May2006, 12:30	88.23
77	1.1970	299.97	15May2006, 14:45	160.69
78	1.1010	573.29	15May2006, 13:20	184.30
79	0.2470	174.73	15May2006, 13:05	71.04
8	38.0230	2592.43	15May2006, 16:05	4312.19
Crum Dam 23-02	028.4420	2313.38	16May2006, 00:00	2972.64
Gage: 23-079	22.7940	2320.31	15May2006, 19:10	2467.96

Project: Final_Crum_Creek Simulation Run: 10-yr

Start of Run: 15May2006, 00:00 Basin Model: Crum 2-yr
End of Run: 17May2006, 00:05 Meteorologic Model 10-YR
Compute Time: 17Aug2007, 09:06:27 Control Specifications: Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	3141.24	15May2006, 15:55	2434.42
10	39.2700	3389.21	16May2006, 03:20	5542.51
101	34.6500	3314.84	16May2006, 03:05	4868.20
102	3.3730	1251.60	15May2006, 14:05	601.01
103	6.4660	1899.50	15May2006, 15:30	964.70
104	9.7830	2547.03	15May2006, 15:15	1431.55
105	1.0750	637.96	15May2006, 12:55	168.81
106	1.3390	864.38	15May2006, 12:40	188.51
11	3.0410	1336.57	15May2006, 13:10	446.90
12	5.3790	1787.43	15May2006, 14:45	806.21
13	1.8550	507.43	15May2006, 13:55	277.77
14	3.3170	982.49	15May2006, 13:45	466.86
15	11.6230	2741.01	15May2006, 15:25	1680.29
16	13.6540	2888.27	15May2006, 14:50	1982.77
17	15.8030	3029.02	15May2006, 15:25	2254.91
18	26.1380	3211.20	15May2006, 20:55	3570.13
19	28.4420	3150.88	15May2006, 23:30	3812.39
20	31.0970	3239.42	15May2006, 23:55	4229.99
21	32.8130	3299.60	16May2006, 00:30	4519.82
22	0.9090	605.75	15May2006, 12:55	164.63
23	33.1290	3314.24	16May2006, 00:40	4592.97
24	2.1760	907.82	15May2006, 13:25	398.14
25	33.5490	3324.49	16May2006, 00:55	4691.81
27	26.1380	3199.93	15May2006, 22:25	3552.24
28	28.4420	3147.66	16May2006, 00:00	3804.63

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	3235.26	16May2006, 00:30	4219.44
3	1.6080	778.12	15May2006, 13:25	257.33
30	32.8100	3297.65	16May2006, 00:45	4515.23
31	0.9090	592.07	15May2006, 13:10	164.63
32	33.1290	3312.81	16May2006, 00:55	4588.52
33	2.1760	889.51	15May2006, 13:55	398.14
34	33.5490	3304.34	16May2006, 03:10	4643.07
36	16.9760	3127.08	15May2006, 17:00	2434.42
37	1.6080	759.34	15May2006, 14:00	257.33
41	22.2940	3065.15	15May2006, 21:00	3106.27
42	38.0230	3381.42	16May2006, 03:20	5461.89
43	3.0410	1219.73	15May2006, 15:00	446.90
44	9.7830	2540.76	15May2006, 15:30	1431.56
45	1.8550	504.96	15May2006, 14:20	277.77
46	5.3790	1751.92	15May2006, 15:35	806.21
47	11.8230	2723.78	15May2006, 16:10	1680.29
48	13.8540	2879.29	15May2006, 15:30	1982.77
49	15.8030	3022.11	15May2006, 16:00	2254.97
50	1.0750	637.96	15May2006, 12:55	158.81
51	1.9660	801.98	15May2006, 13:30	278.09
52	1.6900	620.91	15May2006, 13:45	238.66
53	0.7480	307.15	15May2006, 13:25	120.64
54	1.4050	427.91	15May2006, 14:15	196.70
55	1.0670	442.43	15May2006, 13:25	158.49
56	0.4500	287.06	15May2006, 12:40	61.07
57	1.4620	505.16	15May2006, 13:35	189.09
58	1.3390	864.38	15May2006, 12:40	186.51
59	0.6920	357.46	15May2006, 13:00	113.97
60	2.0400	932.43	15May2006, 13:00	248.74
61	1.9490	1420.77	15May2006, 12:35	272.14
62	1.1730	579.79	15May2006, 13:10	179.51
63	1.6080	778.12	15May2006, 13:25	257.33

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0 7540	280.24	15May2006 13:20	107.33
65	2 9560	2368.52	15May2006, 12:25	378.64
66	2 7790	898.26	15May2006, 13:35	311.32
67	1 0650	451.73	15May2006, 13:15	152.54
68	2.3040	1227.68	15May2006 13:10	348.49
69	1.2660	700.11	15May2006, 13:15	216.00
7	22.2940	3083.02	15May2006, 19:00	3129.41
70	1.3890	1030.56	15May2006, 12:35	209.35
71	0 9090	605.75	15May2006, 12:55	164.63
72	0 8700	378 00	15May2006, 13:40	150.14
73	0 8430	438 20	15May2006, 13:20	150.24
74	0.3190	175 48	15May2006, 13:20	77.74
75	1.2670	481.02	15May2006, 14:30	233 50
76	0.4200	466.52	15May2006, 12:30	103 79
77	1.1970	401 80	15May2006, 14:40	202 88
78	1.1010	722.00	15May2006, 13:15	225 13
79	0.2470	212 27	15May2006, 13:05	80 62
9	38.0230	3383 86	16May2006, 03:00	5468 21
Crum Dam 23-080	38.0420	3150 88	15May2006, 23:30	3812 38
Geisl 23-079	22.2940	3063 02	15May2006, 19:00	3129 41

Project: Final_Crum_Creek Simulation Run: 25-yr

Start of Run:	15May2006, 00:00	Basin Model:	Crum-100-yr
End of Run:	17May2006, 00:05	Meteorologic Model:	25-YR
Compute Time	17Aug2007, 09:06:55	Control Specifications:	Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	3312.08	15May2006, 16:00	2577.52
10	38.2700	5152.64	15May2006, 15:00	6364.45
101	34.6500	4034.68	15May2006, 21:20	5515.58
102	3.3730	1952.23	15May2006, 15:00	770.79
103	6.4660	1933.47	15May2006, 15:45	979.40
104	9.7830	2685.96	15May2006, 15:30	1534.09
105	1.0750	630.38	15May2006, 13:10	184.55
106	1.3390	688.01	15May2006, 12:55	182.18
11	3.0410	1398.63	15May2006, 13:20	469.92
12	5.3790	1824.67	15May2006, 15:00	826.46
13	1.8550	696.27	15May2006, 13:50	359.34
14	3.3170	1169.21	15May2006, 13:50	554.70
15	11.8230	2900.46	15May2006, 15:40	1802.62
16	13.8540	3057.04	15May2006, 16:15	2096.84
17	15.8030	3183.47	15May2006, 15:35	2388.78
18	26.1380	3650.75	15May2006, 19:15	4028.72
19	28.4420	3697.29	15May2006, 20:15	4342.21
20	31.0970	3830.05	15May2006, 20:25	4779.35
21	32.8100	3926.34	15May2006, 20:45	5081.54
22	0.9090	759.59	15May2006, 12:55	195.22
23	33.1290	3948.47	15May2006, 20:50	5165.28
24	2.1760	1521.27	15May2006, 13:40	498.51
25	33.5490	3974.11	15May2006, 21:00	5283.08
27	26.1380	3648.97	15May2006, 19:30	4025.89
28	28.4420	3695.32	15May2006, 20:30	4337.94

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC FT)
29	31.0970	3827.87	15May2006, 20:50	4773.65
3	1.6080	851.03	15May2006, 13:25	274.36
30	32.9100	3925.21	15May2006, 20:55	5079.10
31	0.9090	711.49	15May2006, 13:40	195.22
32	33.1290	3947.63	15May2006, 21:00	5162.93
33	2.1760	1415.38	15May2006, 15:05	496.51
34	33.5490	3971.81	15May2006, 21:25	5276.67
35	16.9760	3299.13	15May2006, 17:10	2577.52
37	1.6080	831.29	15May2006, 14:00	274.36
41	22.2940	3394.17	15May2006, 19:25	3497.13
42	38.0230	5087.68	15May2006, 15:00	6281.26
43	3.0410	1285.73	15May2006, 15:10	469.92
44	9.7830	2676.23	15May2006, 15:45	1534.09
45	1.8550	692.79	15May2006, 14:20	359.34
46	5.3790	1788.49	15May2006, 15:50	826.46
47	11.8230	2879.47	15May2006, 16:20	1902.62
48	13.8540	3047.41	15May2006, 16:50	2096.84
49	15.8030	3178.28	15May2006, 17:15	2368.78
50	1.0750	630.38	15May2006, 13:10	184.65
51	1.9660	820.99	15May2006, 13:35	285.37
52	1.5900	608.35	15May2006, 13:50	237.99
53	0.7480	291.28	15May2006, 13:35	118.55
54	1.4050	589.28	15May2006, 14:10	258.79
55	1.0870	406.14	15May2006, 13:30	152.93
56	0.4590	396.79	15May2006, 12:40	100.55
57	1.4620	500.81	15May2006, 13:40	195.35
58	1.3390	688.01	15May2006, 12:55	182.18
59	0.6920	340.78	15May2006, 13:05	112.03
60	2.0400	976.84	15May2006, 13:05	268.53
61	1.8490	1571.34	15May2006, 12:35	291.94
62	1.1730	620.12	15May2006, 13:10	188.74
63	1.6080	851.03	15May2006, 13:25	274.36

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	343.19	15May2006, 13:25	126.13
65	2.9560	3666.52	15May2006, 12:25	571.92
66	2.7790	883.80	15May2006, 14:15	379.05
67	1.0650	441.69	15May2006, 13:20	152.54
68	2.3040	1455.48	15May2006, 13:10	397.64
69	1.2560	762.11	15May2006, 13:15	228.00
7	22.2940	3396.99	15May2006, 19:05	3500.96
70	1.3890	1058.84	15May2006, 12:40	213.41
71	0.9090	759.59	15May2006, 12:55	195.22
72	0.8700	383.91	15May2006, 13:40	152.41
73	0.8430	463.44	15May2006, 13:20	155.48
74	0.3190	210.99	15May2006, 13:20	86.18
75	1.2670	811.25	15May2006, 13:45	303.29
76	0.4200	585.64	15May2006, 12:30	120.15
77	1.1970	607.67	15May2006, 14:20	272.29
78	1.1010	800.94	15May2006, 13:20	239.91
79	0.2470	241.84	15May2006, 13:05	83.19
9	38.0230	5100.14	15May2006, 14:45	6286.37
Crum Dam 23-0[illegible]420	[illegible]	3697.29	15May2006, 20:15	4342.21
Geisl 23-079	22.2940	3396.99	15May2006, 19:05	3500.96

Project: Final_Crum_Creek Simulation Run: 50-yr

Start of Run: 15May2006, 00:00 Basin Model: Crum-100-yr
End of Run: 17May2006, 00:05 Meteorologic Model: 50-YR
Compute Time: 17Aug2007, 09:07:24 Control Specifications: Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	4303.23	15May2006 15:55	3191.05
10	38.2700	6400.66	15May2006, 15:00	7608.58
101	34.6500	5247.95	15May2006, 20:55	6606.93
102	3.3730	2367.27	15May2006, 15:00	912.66
103	6.4660	2501.31	15May2006, 15:45	1215.25
104	9.7830	3447.60	15May2006, 15:25	1890.83
105	1.0750	808.79	15May2006, 13:10	225.62
106	1.3390	929.45	15May2006, 12:55	228.72
11	3.0410	1816.86	15May2006, 13:20	582.56
12	5.3790	2363.21	15May2006, 14:55	1024.60
13	1.8550	858.67	15May2006, 13:50	429.50
14	3.3170	1498.41	15May2006, 13:45	675.58
15	11.8230	3719.15	15May2006, 15:35	2231.61
16	13.8540	3934.71	15May2006, 14:55	2596.85
17	15.8030	4141.92	15May2006, 15:25	2959.24
18	26.1380	4744.62	15May2006, 18:55	4986.88
19	28.4420	4834.27	15May2006, 19:55	5387.81
20	31.0970	4999.40	15May2006, 20:00	5926.25
21	32.8100	5118.53	15May2006, 20:20	6294.50
22	0.9090	927.65	15May2006, 12:55	231.81
23	33.1290	5144.67	15May2006, 20:25	6391.02
24	2.1760	1836.70	15May2006, 13:40	589.00
25	33.5490	5174.41	15May2006, 20:35	6526.74
27	26.1380	4743.10	15May2006, 19:10	4984.01
28	28.4420	4832.34	15May2006, 20:10	5393.42

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	4997.32	15May2006, 20:25	5920.38
3	1.6080	1081.86	15May2006, 13:25	336.91
30	32.8100	5117.36	15May2006, 20:30	6291.99
31	0.9090	868.77	15May2006, 13:40	237.81
32	33.7290	5143.77	15May2006, 20:35	6388.60
33	2.1760	1707.91	15May2006, 15:05	589.00
34	33.5490	5171.94	15May2006, 21:00	6520.13
36	16.9760	4281.52	15May2006, 17:00	3191.05
37	1.6080	1056.15	15May2006, 14:00	336.91
41	22.2940	4416.71	15May2006, 19:10	4316.87
42	38.0230	6319.87	15May2006, 15:00	7714.31
43	3.0410	1667.25	15May2006, 15:10	582.56
44	9.7830	3439.13	15May2006, 15:40	1890.83
45	1.8550	854.34	15May2006, 14:15	429.50
46	5.3790	2918.83	15May2006, 15:45	1024.60
47	11.8230	3694.87	15May2006, 16:20	2231.61
48	13.8540	3921.60	15May2006, 15:30	2596.85
49	15.8030	4131.53	15May2006, 16:00	2959.24
50	1.0750	808.79	15May2006, 13:10	225.62
51	1.9660	1072.35	15May2006, 13:35	356.93
52	1.5900	799.58	15May2006, 13:50	297.05
53	0.7480	388.24	15May2006, 13:30	144.99
54	1.4050	728.00	15May2006, 14:10	312.15
55	1.0870	547.25	15May2006, 13:30	190.35
56	0.4500	491.28	15May2006, 12:40	117.35
57	1.4620	675.59	15May2006, 13:40	243.08
58	1.3390	929.45	15May2006, 12:55	228.72
59	0.6920	454.43	15May2006, 13:05	136.52
60	2.0400	1316.90	15May2006, 13:05	340.78
61	1.9490	2018.72	15May2006, 12:35	362.39
62	1.1730	800.51	15May2006, 13:10	231.82
63	1.6080	1081.86	15May2006, 13:25	336.91

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	453.70	15May2006, 13:20	153.92
65	2.9560	4464.07	15May2006, 12:25	688.49
66	2.7790	1174.64	15May2006, 14:10	480.92
67	1.0650	587.17	15May2006, 13:20	189.09
68	2.3040	1817.09	15May2006, 13:10	486.61
69	1.2660	966.51	15May2006, 13:15	278.22
7	22.2940	4419.55	15May2006, 18:50	4320.76
70	1.3890	1384.43	15May2006, 12:35	264.61
71	0.9090	927.65	15May2006, 12:55	231.81
72	0.8700	497.59	15May2006, 13:40	185.75
73	0.8430	593.16	15May2006, 13:20	188.38
74	0.3190	258.22	15May2006, 13:20	99.03
75	1.2670	969.17	15May2006, 13:45	357.19
76	0.4200	698.96	15May2006, 12:30	138.15
77	1.1970	735.51	15May2006, 14:20	323.66
78	1.1010	990.81	15May2006, 13:20	285.80
79	0.2470	289.19	15May2006, 13:05	94.28
9	38.0230	6338.25	15May2006, 14:45	7719.59
Crum Dam 23	22.4420	4834.27	15May2006, 19:55	5387.81
Geist 23-079	22.2940	4419.55	15May2006, 18:50	4320.76

Project: Final_Crum_Creek Simulation Run: 100-yr

Start of Run:	15May2006, 00:00	Basin Model:	Crum-100-yr
End of Run:	17May2006, 00:05	Meteorologic Model:	100-YR
Compute Time:	22Aug2007, 09:52:43	Control Specifications:	Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	5450.65	15May2006, 15:50	3891.84
10	38.2700	7838.47	15May2006, 15:05	9445.09
101	34.6500	6598.96	15May2006, 20:30	8273.74
102	3.3730	2814.51	15May2006, 15:00	1070.34
103	6.4660	3144.55	15May2006, 15:40	1484.41
104	9.7830	4311.04	15May2006, 15:25	2297.65
105	1.0750	1010.07	15May2006, 13:05	272.12
106	1.3390	1205.40	15May2006, 12:55	282.27
11	3.0410	2289.32	15May2006, 13:20	710.70
12	5.3790	2973.27	15May2006, 14:55	1250.32
13	1.8550	1041.76	15May2006, 13:50	508.77
14	3.3170	1876.35	15May2006, 13:45	813.25
15	11.8230	4645.50	15May2006, 15:30	2721.36
16	13.8540	5001.99	15May2006, 14:45	3168.25
17	15.8030	5753.02	15May2006, 15:20	3610.97
18	26.1380	5965.12	15May2006, 18:40	6078.40
19	28.4420	8098.34	15May2006, 19:35	6578.23
20	31.0970	6299.76	15May2006, 19:45	7231.36
21	32.8100	6445.03	15May2006, 20:00	7674.34
22	0.9090	1114.37	15May2006, 12:55	272.78
23	33.1290	6475.91	15May2006, 20:05	7785.17
24	2.1760	2186.21	15May2006, 13:40	689.73
25	33.5490	6510.51	15May2006, 20:15	7940.77
27	26.1380	5983.75	15May2006, 18:55	8075.49
28	28.4420	6096.27	15May2006, 19:50	8573.72

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	6297.61	15May2006, 20:05	7225.33
3	1.6080	1339.64	15May2006, 13:25	407.50
30	32.8100	6443.98	15May2006, 20:05	7671.75
31	0.9090	1043.81	15May2006, 13:40	272.78
32	33.1290	6474.89	15May2006, 20:15	7782.68
33	2.1760	2037.01	15May2006, 16:05	689.73
34	33.5490	6508.17	15May2006, 20:35	7933.95
36	16.9760	5418.23	15May2006, 16:55	3891.84
37	1.6080	1307.20	15May2006, 14:00	407.50
41	22.2940	5555.20	15May2006, 19:00	5250.03
42	38.0230	7751.44	15May2006, 15:10	9338.53
43	3.0410	2098.72	15May2006, 15:05	710.70
44	9.7830	4299.80	15May2006, 15:40	2297.65
45	1.8550	1036.74	15May2006, 14:15	508.77
46	5.3790	2915.43	15May2006, 15:45	1250.32
47	11.8230	4620.73	15May2006, 16:15	2721.36
48	13.8540	4993.09	15May2006, 15:25	3168.25
49	15.8030	5237.32	15May2006, 15:55	3510.97
50	1.0750	1019.07	15May2006, 13:05	272.12
51	1.9660	1357.39	15May2006, 13:35	438.58
52	1.5900	1016.73	15May2006, 13:45	364.29
53	0.7480	499.26	15May2006, 13:30	175.34
54	1.4050	884.37	15May2006, 14:10	372.40
55	1.0870	710.35	15May2006, 13:25	234.08
56	0.4500	597.97	15May2006, 12:40	136.37
57	1.4620	876.73	15May2006, 13:40	304.48
58	1.3390	1205.40	15May2006, 12:55	282.27
59	0.6920	583.90	15May2006, 13:05	164.62
60	2.0400	1708.25	15May2006, 13:00	423.71
61	1.9490	2525.41	15May2006, 12:35	442.72
62	1.1730	1004.43	15May2006, 13:10	280.86
63	1.6080	1339.64	15May2006, 13:25	407.50

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	579.23	15May2006, 13:20	185.62
65	2.9560	5356.38	15May2006, 12:25	819.78
66	2.7790	1506.10	15May2006, 14:10	597.70
67	1.0650	754.56	15May2006, 13:15	231.16
68	2.3040	2222.39	15May2006, 13:10	586.97
69	1.2660	1193.28	15May2006, 13:15	334.72
7	22.2940	5558.13	15May2006, 18:40	5253.97
70	1.3890	1752.19	15May2006, 12:35	322.92
71	0.9090	1114.67	15May2006, 12:55	272.78
72	0.8700	625.12	15May2006, 13:40	223.50
73	0.8430	737.67	15May2006, 13:20	225.51
74	0.3190	310.72	15May2006, 13:20	113.43
75	1.2670	1143.32	15May2006, 13:45	416.95
76	0.4200	823.34	15May2006, 12:30	158.08
77	1.1970	875.49	15May2006, 14:20	380.60
78	1.1010	1194.32	15May2006, 13:20	339.79
79	0.2170	339.33	15May2006, 13:05	106.46
9	38.0230	7766.51	15May2006, 14:50	9344.08
Crum Dam 23-[illegible]4120		6098.34	15May2006, 19:35	6578.23
Geist 23-079	22.2940	5558.13	15May2006, 18:40	5253.97

Project: Final_Crum_Creek Simulation Run: 100 Future

Start of Run:	15May2006, 00:00	Basin Model:	Crum-100-yr FLU
End of Run:	17May2006, 00:05	Meteorologic Model:	100-YR
Compute Time:	22Aug2007, 09:48:30	Control Specifications	Synthetic Storm

Volume Units: AC-FT

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
1	16.9760	5488.07	15May2006, 15:50	3971.74
10	38.2700	7862.63	15May2006, 15:05	9550.67
101	34.6500	6696.59	15May2006, 20:30	8378.87
102	3.3730	2817.17	15May2006, 15:00	1071.10
103	6.4660	3248.46	15May2006, 15:45	1516.20
104	9.7630	4403.48	15May2006, 15:25	2331.00
105	1.0750	1019.25	15May2006, 13:05	273.99
106	1.3390	1215.44	15May2006, 12:55	284.05
11	3.0410	2409.53	15May2006, 13:20	741.13
12	5.3790	3082.24	15May2006, 14:55	1281.53
13	1.8550	1040.97	15May2006, 13:50	508.61
14	3.3170	1882.40	15May2006, 13:45	814.80
15	11.8230	4731.68	15May2006, 15:35	2753.89
16	13.8540	5016.46	15May2006, 14:45	3201.80
17	15.8030	5281.70	15May2006, 15:20	3677.48
18	26.1380	6049.29	15May2006, 18:40	6177.40
19	28.4420	6192.33	15May2006, 19:35	6684.19
20	31.0970	6394.98	15May2006, 19:40	7338.38
21	32.8100	6541.24	15May2006, 19:55	7780.81
22	0.9090	1176.61	15May2006, 12:55	273.18
23	33.1290	6572.11	15May2006, 20:05	7891.26
24	2.1760	2188.99	15May2006, 13:40	690.45
25	33.5490	6607.28	15May2006, 20:10	8046.66
27	26.1380	6048.12	15May2006, 18:55	6174.48
28	28.4420	6190.51	15May2006, 19:50	6679.67

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
29	31.0970	6392.84	15May2006, 20:00	7332.33
3	1.6080	1377.38	15May2006, 13:25	416.68
30	32.8100	6540.23	15May2006, 20:05	7778.22
31	0.9090	1045.63	15May2006, 13:40	273.18
32	33.1290	6571.29	15May2006, 20:10	7888.76
33	2.1760	2034.55	15May2006, 15:05	690.45
34	33.5490	6605.03	15May2006, 20:35	8039.83
36	16.9760	5456.91	15May2006, 16:55	3971.74
37	1.6080	1343.86	15May2006, 14:00	416.68
41	22.2940	5640.74	15May2006, 19:05	5346.25
42	38.0230	7778.57	15May2006, 15:10	9444.50
43	3.0410	2209.43	15May2006, 15:05	741.13
44	9.7830	4392.47	15May2006, 15:40	2331.00
45	1.8550	1036.00	15May2006, 14:15	508.61
46	5.3790	3020.92	15May2006, 15:45	1261.53
47	11.8230	4699.74	15May2006, 16:20	2753.89
48	13.8540	4998.46	15May2006, 15:25	3201.80
49	15.8030	5266.69	15May2006, 15:55	3677.48
50	1.0750	1019.25	15May2006, 13:05	273.99
51	1.9660	1468.27	15May2006, 13:35	467.14
52	1.5900	1020.14	15May2006, 13:45	365.24
53	0.7480	496.56	15May2006, 13:30	175.16
54	1.4050	883.22	15May2006, 14:10	371.99
55	1.0870	712.78	15May2006, 13:25	284.67
56	0.4500	599.51	15May2006, 12:40	136.62
57	1.4620	863.10	15May2006, 13:40	306.19
58	1.3390	1215.44	15May2006, 12:55	284.06
59	0.6920	580.10	15May2006, 13:05	163.87
60	2.0400	1703.97	15May2006, 13:00	422.89
61	1.9490	2759.45	15May2006, 12:35	475.68
62	1.1730	1066.91	15May2006, 13:10	294.26
63	1.6080	1377.38	15May2006, 13:25	416.68

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
64	0.7540	603.00	15May2006, 13:20	191.00
65	2.9560	5369.18	15May2006, 12:25	821.08
66	2.7790	1514.40	15May2006, 14:10	599.88
67	1.0650	755.02	15May2006, 13:15	231.27
68	2.3040	2253.98	15May2006, 13:10	594.05
69	1.2660	1196.78	15May2006, 13:15	335.27
7	22.2940	5643.57	15May2006, 18:45	5350.19
70	1.3890	1755.85	15May2006, 12:35	323.43
71	0.9060	1116.61	15May2006, 12:55	273.18
72	0.8700	622.08	15May2006, 13:40	222.69
73	0.8430	738.93	15May2006, 13:20	225.80
74	0.3190	309.18	15May2006, 13:20	113.04
75	1.2670	1144.28	15May2006, 13:45	417.28
76	0.4200	822.18	15May2006, 12:30	157.90
77	1.1970	875.60	15May2006, 14:20	360.65
78	1.1010	1190.98	15May2006, 13:20	339.04
79	0.2470	338.00	15May2006, 13:05	106.17
9	36.0230	7792.28	15May2006, 14:50	9449.97
Crum Dam 23-080	28.4420	6192.33	15May2006, 19:35	6684.19
Geist 23-079	22.2940	5643.57	15May2006, 18:45	5350.19

C. OBSTRUCTION CAPACITY SUMMARY FORMS (FORM B)

Box Culvert / Box Bridge Capacity Computation Sheet

Watershed: Crum Creek

Computed by:

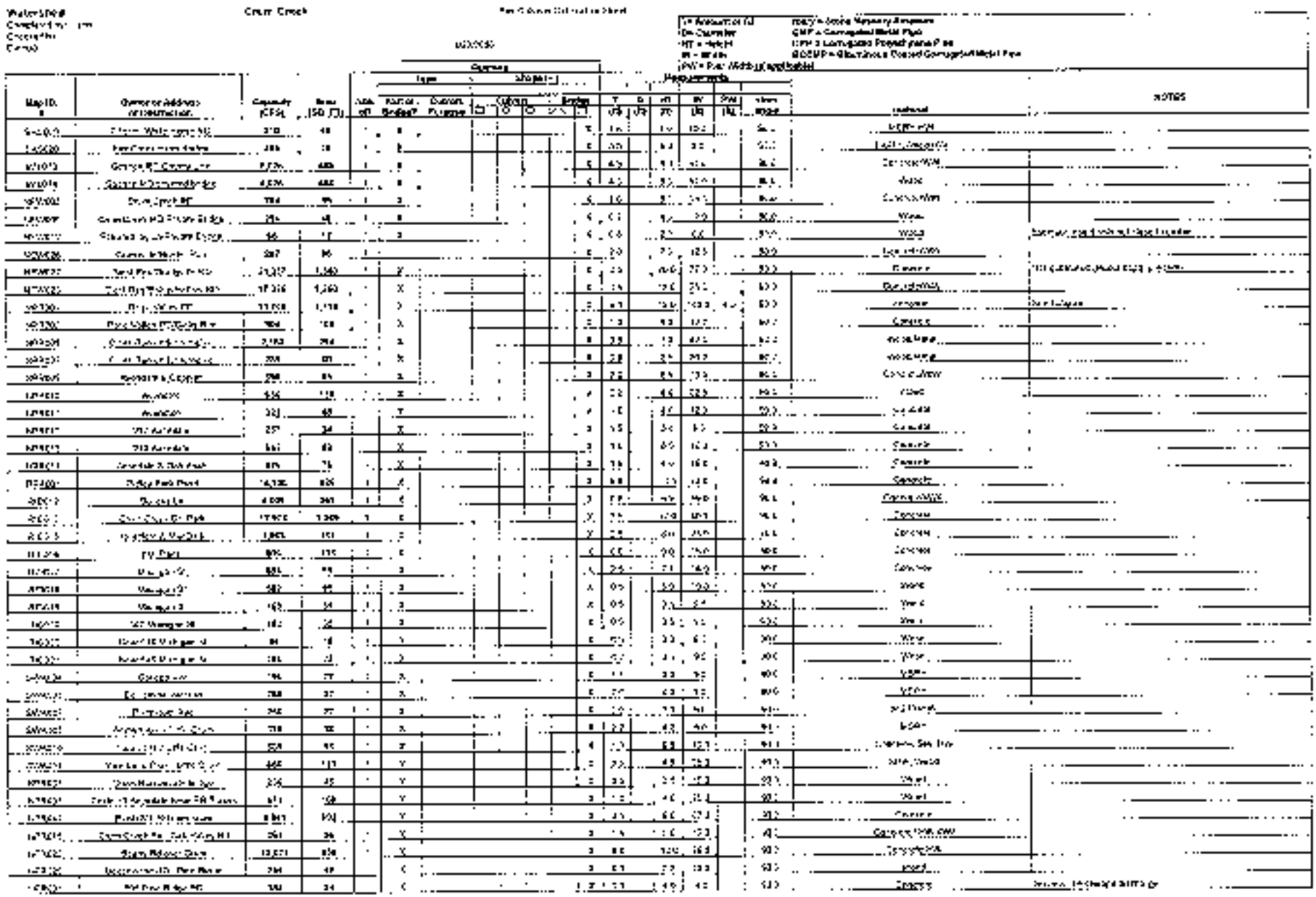
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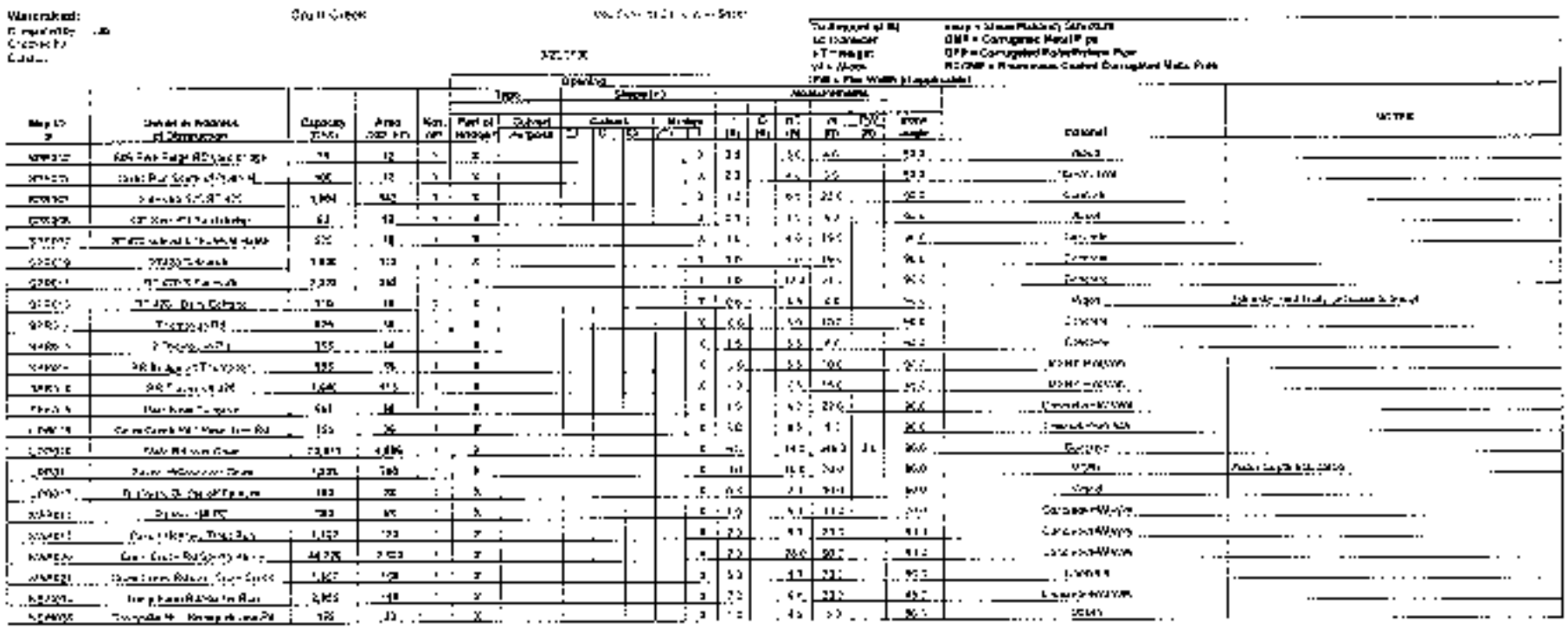
Date:

Box Culvert Computation Sheet

Type of Inlet	Inlet Control Capacity Equations
D = Diameter	CMP = Corrugated Metal Pipe
H = Height	CPP = Corrugated Polyethylene Pipe
W = Width	SCCMP = Structural Plate Corrugated Metal Pipe
T (Use 2 for Width/Rise Ratio)	

Key ID #	Owner or Nature of Obstruction	Capacity (CFS)	Area (SQ. FT.)	Use (yr)	Type														Material	NOTES
					Bridge?	Culvert?	Culvert			Bridge										
							C	D	CP	A	T	H	H/D	W	W/D	Wall Angle		
WA007	Private Culvert #1	56	5				X					2.5		3.1		0.7		90.0	Corrugated Metal	
WA008	Driveway	453	57				X					8.0		9.0		12.1	1	90.0	Concrete Box	Culvert
WA009	Private Culvert #2	211	24				X					3.5		4.3		5.1		90.0	Concrete Box	
WA010	Access Rd	85	8				X					2.5		3.7		4.2		90.0	Corrugated Metal	
WA011	Road Culvert	553	40				X					6.0		6.8		13.9		90.0	Concrete Box	
WA012	Driveway Culvert	89	10				X					3.0		3.5		13.9		90.0	Concrete Box	
WA013	Private Culvert #3	18	3				X					1.5		1.7		2.5		90.0	Concrete	Widen to match Box Culvert
WA014	Private Culvert #4 Driveway	153	17				X					2.5		3.1		5.1		90.0	Concrete	Very Clogged
WA015	Private Culvert #5	364	38				X					4.0		4.9		9.2		90.0	Corrugated Metal	2.5 Inch Ribs Corrugated
WA016	Pool Creek Bridge Abutment	18	3				X					0		1.1		2.1		90.0	Wall / Fill	
WA017	Private Culvert #6 Driveway	311	27				X					3.5		5.0		10.5		90.0	Concrete Box	Culvert
WA018	Private Culvert #7	431	58				X					3.5		5.0		10.5		90.0	Concrete	Culvert
WA019	Private Culvert #8	312	44				X					3.5		4.0		11.5		90.0	Concrete	Culvert
WA020	Private Culvert #9 Pool Creek Drive	521	48				X					4.0		4.3		9.6		90.0	Concrete Box	Culvert
WA021	Pool Bridge NB WB Culvert	841	28				X					3.5/3.5		3.5		8.1		90.0	Concrete Box	Culvert
WA022	Pool Creek Rd	151	13				X					2.5		3.0		6.1		90.0	Concrete Box	Culvert
WA023	Private Culvert #10	155	18				X					2.5		4.0		7.2		90.0	Concrete Box	Culvert
WA024	Private Culvert #11 Driveway	189	24				X					3.5		3.9		12.5		90.0	Concrete Box	
WA025	Private Culvert #12	645	15				X					3.5		4.9		10.5		90.0	Concrete Box	Culvert
WA026	Private Culvert #13	313	16				X					4.5		4.9		4.5		90.0	Concrete Box	Culvert
WA027	Ridge Line Water Main Culvert	1,185	180				X					3.7		7.9		17.5		90.0	Concrete	
WA028	Crum Creek Culvert	431	68				X					3.0		9.0		9.4		90.0	Concrete Box	Culvert Inlet
WA029	Crum Creek Walkway 2	283	45				X					4.0		4.5		8.8		90.0	Concrete Box	
WA030	Crum Creek Walkway 3	284	45				X					4.0		4.5		8.8		90.0	Concrete Box	
WA031	Crum Creek Culvert #12	1,093	15				X					3.5		4.9		7.0		90.0	Concrete Box	Culvert
WA	Penn DOT	5,145	125	75	3					X		13.5		13.5	2.0	20.0		90.0	Concrete	Box Culvert
WA032	RR Bridge (West)	23,634	1,184		3					X		6.2		12.5	1.5	5.6		90.0	Concrete	RR Bridge
WA033	RR Bridge (Center)	23,366	1,212		3					X		6.2		14.0	12.5	5.6		90.0	Concrete	Box 1
WA034	RR Bridge (East)	18,368	1,413		3					X		6.2		12.5	9.6	5.6		90.0	Concrete	Box 2
WA035	Private Culvert #14	1,016	164		X							6.0		8.5		20.4		90.0	Concrete	Culvert
WA036	Culvert #15	80	40		X							3.5		4.0		10.4		90.0	Concrete	Culvert
WA037	Culvert #16	198	24		X							3.5		4.0		8.4		90.0	Corrugated Metal	
WA038	Private Culvert #17	88	12		X							3.5		3.8		5.1		90.0	Concrete	Box Culvert
WA039	Culvert	791	78		X							4.0		5.5		5.1		90.0	Concrete	
WA040	Bentley Systems Culvert	351	90		X							4.0		5.2		10.5		90.0	Concrete	
WA041	Private Culvert #18	4,258	137		5							6.0		9.2		12.1		90.0	Concrete	
WA042	Private Culvert #19	4,538	228		5							6.2		7.4	5.0	10.5		90.0	Concrete	Culvert
WA043	Culvert #20	1,564	265		5							5.5		9.2		10.5		90.0	Concrete Box	
WA044	Private Culvert #21	455	52		5							3.5		4.0		9.1		90.0	Culvert	
WA045	Private Culvert #22	1,202	144		5							4.7		4.9	3.0	9.4		90.0	Corrugated Metal	Pipe
WA046	Private Culvert #23	526	64		5							3.5		4.0		8.4		90.0	Metal Culvert	
WA047	Culvert Walkway	2,870	400		5							6.0		10.0	8.5	14.0		90.0	Concrete Box	Culvert
WA048	Private Culvert #24	948	108		5							3.5		6.0	4.5	9.4		90.0	Concrete	Culvert
WA049	Penn Central Bridge	4,899	400		5							6.5		10.0	8.5	14.0		90.0	Metal Corrugated	





Circular Culvert Capacity Calculation Sheet

Watershed: Crum Creek

Circular Culvert Calculation Sheet

Type/Mat'l by:

Checked by:

Date:

NOTE: Distance parameters assumed to CVP pipe invert unless indicated otherwise

Map ID #	Owner or Address (Location)	Capacity (CFS)	Area (SQ. FT.)	No. of	Pipe or Bridge?	Culvert Purpose	Culvert Shape: C	O	Bridge: A	S	T	D (in)	INV (in)	X (ft)	SLO (ft)	Skew angle	Material	NOTES
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	Concrete (CP, CMP, ...	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W, MW	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=RD	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W,MW	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			45.0	RCP=W	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP, MP, SW, WW	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	Concrete=HW	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			45.0	CMP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	use=V	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	SW=W	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/SW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/WW	Clogged
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	ACP=W, MW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CMP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/WW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/WW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/WW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CVP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CVP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CVP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			72.0	CVP	Overflow weir to [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CMP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CMP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CMP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP=W/WW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	RCP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	SCP=W	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X					[illegible]	[illegible]			90.0	CMP=W	

Type = Bare Masonry Stacked
CVP = Corrugated Metal Pipe
CPP = Complete Polyethylene Pipe
RCP = Reinforced Circular Concrete Metal Pipe
RW = Reinforced
MW = Masonry Wingwalls/Apron

Watershed: Crum Creek — Culvert/Culvert Calculation Chart

Calculated by: Joe
Checked by:
Date: 2/23/2010

NOTE: Different colors/hatches added to show RCP and PCP culverts in capacity

T = Thickness
D = Diameter
H = Height
W = Width
CMP = Corrugated Metal Pipe
CPP = Corrugated Polyethylene Pipe
RCCB = Reinforced Concrete Box
PVC = Polyvinyl Chloride Pipe

Map ID #	Owner or Access or Obstruction	Capacity (cfs)	Area (sq. ft.)	Risk (H/L)	Type: Road Bridge	Type: Culvert Purpose	Shape (✓): Circular	Shape (✓): Ellipse	Shape (✓): Arch	Shape (✓): Box	T (in)	C (in)	HF (Y)	W (ft)	H (ft)	Skew Angle	Material	NOTES
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	CMP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	RCCB/PCW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	CMP	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	CMP/PVC/HW	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	CMP	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	RCCB/PVC	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			X				[illegible]	[illegible]				90.0	[illegible]

Watershed: Crum Creek

Completed by: [illegible]

Date (mm/dd/yyyy): 2/22/2006

NOTE: Enter all parameters, assumptions for all Pond, FCP culvert or capacity

A = Area (SQ FT)
D = Diameter
HT = Height
W = Width
L = Length (if applicable)

Alum = Bituminous Aluminized Steel Pipe
CMP = Corrugated Metal Pipe
CPP = Corrugated Polyethylene Pipe
BCMP = Bituminous Coated Corrugated Metal Pipe

Map ID #	Owner or Access of Obstruction	Capacity (CFS)	Area (SQ. FT)	Fish Passage (Y/N)	Opening Type	Shape (+)	Dimensions (ft)					Flow Regime	NOTES
					Paved / Natural	Culvert / Bridge	Culvert / Purpose	Shape	(L)	(D)	(HT)	(W)			
[illegible]	708 Sproul Road RD	194	19.87					X		4.0			90.0		[illegible]
[illegible]	704 Sproul Road RD	195	19.65					X		3.0			90.0		[illegible]
[illegible]	[illegible]	58	7.87					X		3.0			90.0		[illegible]
[illegible]	Country Club RD	139	16.40					X		4.0			90.0		[illegible]
[illegible]	Laurel RD	256	19.65					X		5.0			90.0		[illegible]
[illegible]	411 Rose Hill	174	19.90					X		4.0			90.0		[illegible]
[illegible]	Taylor Hill 2001 Lane	75	7.87					X		3.0			90.0		[illegible]
[illegible]	Sproul Road	33	12.57					X		4.0			90.0		[illegible]
[illegible]	[illegible]	61	7.87					X		3.0			90.0		[illegible]
[illegible]	Dog Kennel RD	16	3.01					X		3.0			90.0		[illegible]
[illegible]	Dog Kennel RD	16	3.01					X		3.0			90.0		[illegible]
[illegible]	Fairway RD	67	7.87					X		3.0			90.0		[illegible]
[illegible]	[illegible]	66	7.87					X		3.0			90.0		[illegible]
[illegible]	Crum Creek Rd culvert pipe	12	1.77					X		1.5			90.0		[illegible]
[illegible]	Park View Dr	489	19.65					X		5.0			90.0		[illegible]
[illegible]	[illegible]	19	7.87					X		4.0			90.0		[illegible]
[illegible]	[illegible]	67	9.81					X		3.5			90.0		[illegible]
[illegible]	Crum Creek Trib	51	9.81					X		3.5			90.0		[illegible]
[illegible]	[illegible]	39	3.14					X		2.0			90.0		[illegible]
[illegible]	[illegible]	161	12.57					X		5.0			90.0		[illegible]
[illegible]	Paoli Hospital	62	7.87					X		4.0			90.0		[illegible]
[illegible]	[illegible]	106	7.87					X		5.0			90.0		[illegible]
[illegible]	[illegible]	185	12.57					X		5.0			90.0		[illegible]
[illegible]	[illegible]	194	12.57					X		5.0			90.0		[illegible]
[illegible]	[illegible]	136	19.65					X		5.0			90.0		[illegible]
[illegible]	Old Wayne Rd	394	19.63					X		5.0			90.0		[illegible]
[illegible]	[illegible]	41	5.16					X		4.0			90.0		[illegible]
[illegible]	[illegible]	61	7.07					X		3.0			90.0		[illegible]
[illegible]	[illegible]	21	3.77					X		4.0			90.0		[illegible]
[illegible]	Waters Avenue	11	0.79					X		2.0			90.0		[illegible]
[illegible]	[illegible]	2	0.20					X		1.5	2.0		90.0	FCP	[illegible]
[illegible]	[illegible]	134	7.07					X		3.0			90.0		[illegible]

Hydraulic Capacity Calculation Sheet

Watershed: Crum Creek

Design Storm: 100-yr

Checked by:

Date: 7/17/2008

NOTE: Different percentages assigned to CMP and RCP culverts in capacity column

Map ID #	Owner or Address (MS Map Number)	Capacity (CFS)	Area (Sq. Ft.)	Yes or No	Opening Type: Pipe/Culvert Range	Opening Type: Culvert Purpose	Opening Shape: Circular (C)	Opening Shape: Square (S)	Opening Shape: Other (O)	Arch Angle (°)	T (in)	D (in)	Measurements: HT (ft)	Measurements: W (ft)	Measurements: W/H - Skew (°)	Material	Notes
WA0012	2472 White Horse RD	114	19.83	1				X			0.9		5.1	4.0	90.0	SCCM/HW	
WA036	Devon PIT Waste Separation	77	5.76	1				X			1.4		4.2	4.2	90.0	MSW/HW	Side Cut 3ft
WA043	Private PIT 357 New Middle	160	16.66	2				X			0.5		4.5	4.0	90.0	CMP	2 Open Ditches
CA0012	Valley Horse PIT 2000 Horse Stable	280	15.17	2				X			2.4		4.5	5.1	65.0	RCP/HW/WW	Side Ditches
CA0012	2400 White Horse	88	9.38	2				X			0.5		4.5	4.0	65.0	RCP/HW/WW	Side Ditches
nEW01	Private	167	11.76	2				X			1.0		3.2	4.5	90.0	RCP	Open Drainage Ditch
WA 002	Pennock Nursery	86	9.18	2				X			0.9		7.3	5.0	90.0	SCCM?	Side Ditches
EA0001	Dairy RM5521	548	61.26	1				X			2.8		5.2	7.5	45.0	CMP-HW	Pipe Culvert Under
EA0002	Waynesborough Dr. Golf	28	15.74	1				X			1		2.5	5.7	90.0	RCC/CS-HW/WW	Side Drainage
nCB035	Ashbridge Kilmer	51	3.53	1				X			2.0		1.5	5.3	45.0	CS/CM/WW	Drainage Ditch (Natural)
WA010	Crum Creek RD	69	15.74	1				X			0.7		3.5	5.3	90.0	CMP-HW	Natural Stream pipe
nCB010	Valley Run RD	124	10.37	1				X			0.7		4.2	5.3	90.0	CM/HW/WW	asphalt
WA001	Swarthmore Borough Water	187	19.85	1				X			2.4		4.5	6.3	90.0	RCP-HW/WW	Drainage around culvert type
WA008	Ridley Ln	153	13.74	1				X			1.0		3.5	5.3	90.0	RCP/HW/WW	
WA015	Malvern Preparatory	151	21.2	1				X			1.0		4.2	6.3	90.0	CS/CM/HW/WW	
WA009	Long Lane	77	11.78	1				X			1.1		3.5	5.5	90.0	HDPE/W	
WA021	Rose Lane	116	1.13	2				X			1.2		2.1	4.2	90.0	CMP-W	Support Structure
WA025	Blueridge Cross RD	89	13.88	1				X			0.7		3.5	5.8	90.0	CMP-W/WW	
WA026	Sugartown RD	84	13.85	1			X				1.0		3.1	5.3	90.0	CVP	Outlet into Crum Creek Pipe
WA029	Spring RD	568	11.74	2			X				3.0		5.1	5.5	90.0	CVP	Spring, Old Culvert
WA030	Crum Creek (piped)	317	19.66	4			X				2.5		4.0	4.0	90.0	CVP	Crum Creek, Confluence, See Diagram
WA031	Crum Creek (piped)	305	19.66	4			X				2.5		4.0	4.0	90.0	CVP	Crum Creek
WA032	Providence RD	116	19.89	1			X				0.9		4.0	4.0	180.0	WSP/HW	
WA033	Providence RD (Alpha)	114	19.91	1			X				1.0		3.5	5.5	90.0	SCCM/HW	
WA034	437 Providence	28	4.71	1			X				0.5		2.2	3.0	90.0	SP	Corroded
WA035	Providence Rd. off Alpha	105	19.85	1			X				0.7		4.2	5.0	90.0	SP	
WA042	Valley Run RD	165	19.85	1			X				1.2		4.2	5.0	270.0	CM/S	
WA045	Valley RD (New)	57	7.65	1			X				1.0		2.5	4.0	90.0	CMP	
WA055	4 Winds Ln	350	32.93	1			X				2.5		5.3	7.0	90.0	CMP-HW/WW	
WA064	Sam RD	76	8.84	1			X				2.2		2.5	4.5	90.0	CMP	
WA065	Saddle Ln/Lewis Run	42	24.52	1			X				3.1		5.5	6.0	90.0	HDPE/W	
WA067	Saddle Valley Ln/Lewis Run	338	24.56	1			X				3.0		5.5	5.0	90.0	HDPE/W	
WA070	Rolling Valley	177	19.85	1			X				2.4		5.1	6.3	90.0	HDPE/W	
WA080	Leiby Way	317	19.63	1			X				1.9		5.1	6.3	90.0	CM/HW/WW	Drainage Ditch
WA090	Deep Run RD	146	19.85	1			X				1.7		3.9	6.3	90.0	RCP/HW/WW	
WA099	Crum Creek, Lower Middle RD	332	19.83	1			X				4.1		4.5	5.5	90.0	CM/HW	
WA103	213 Crum Creek RD	634	27.69	1			X				10.0		5.1	7.3	90.0	RCP/HW/WW	
WA105	Old Maple Rd/Crum Creek	336	19.73	1			X				2.5		4.5	7.3	90.0	CM/HW	

Type/Material: RCP = Reinforced Concrete Pipe; CMP = Corrugated Metal Pipe; CPP = Corrugated Polyethylene Pipe; W/H = Width; W/W/WP = Wood/Wood Concrete Composite/Metal Pipe; W/W = Post Warm (Lead Lined)

Watershed: Crum Creek

Crosswalk ID:

Crosswalk by:

Subbasin: [illegible]

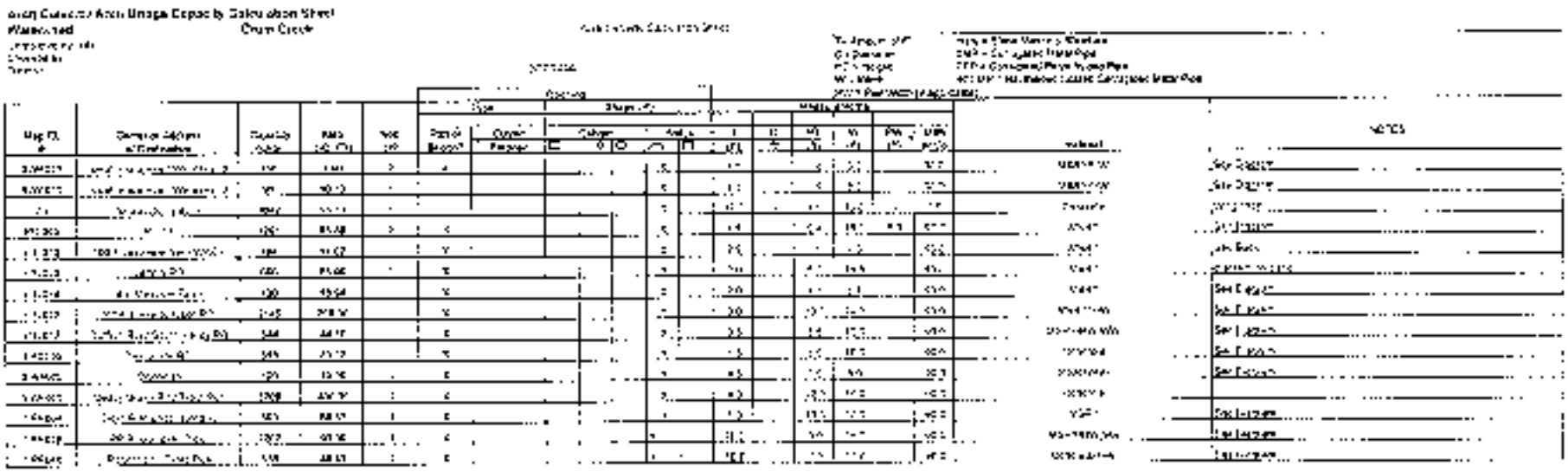
Hydrologic Calculation Point:

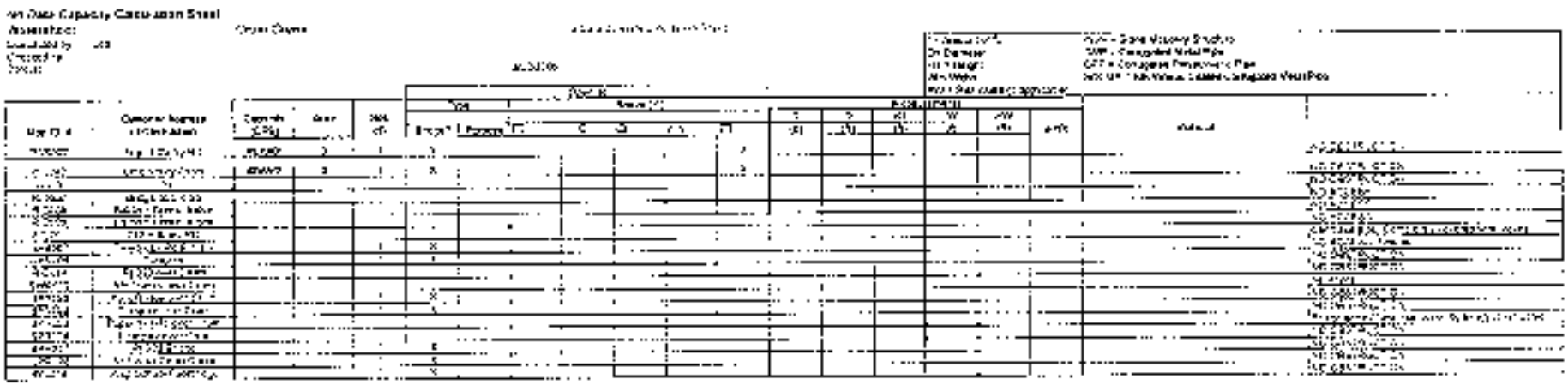
NOTE: Different Lowercase Letters in CMP and RCP columns to capacity columns

Map ID. #	Owner's Address of Observation	Approach (Q=50)	Area (Ac. or Ft.)	Sou ard	Opening Type: Primary Storage	Opening Type: Subject Purpose	Shape			Slope	Measurements: T	D	HT	W	PW	Length	material
[illegible]	[illegible]	50	9.32						6		1.4		1.2	4.0		12.0	CMP/CPP
[illegible]	[illegible]	50	10.00						6		1.4		1.1	4.0		12.0	CMP/CPP

T = Area of Pipe
D = Diameter
HT = Height
W = Width
PW = Pipe Width (Lateral only)

mw = Stone Masonry Structure
CMP = Corrugated Metal Pipe
CPP = Corrugated Polyethylene Pipe
SCCMP = Structural Corrugated Metal Plate

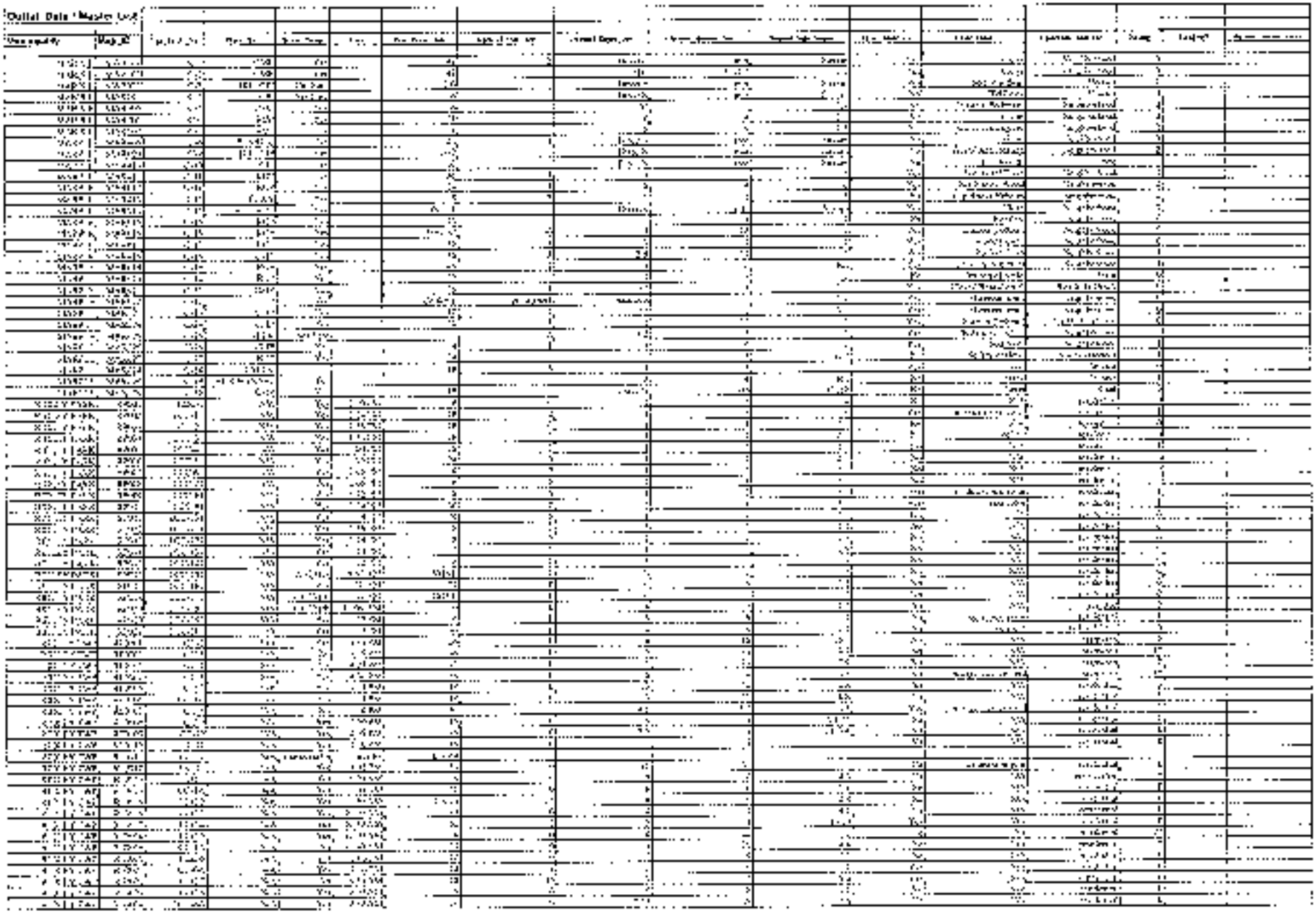


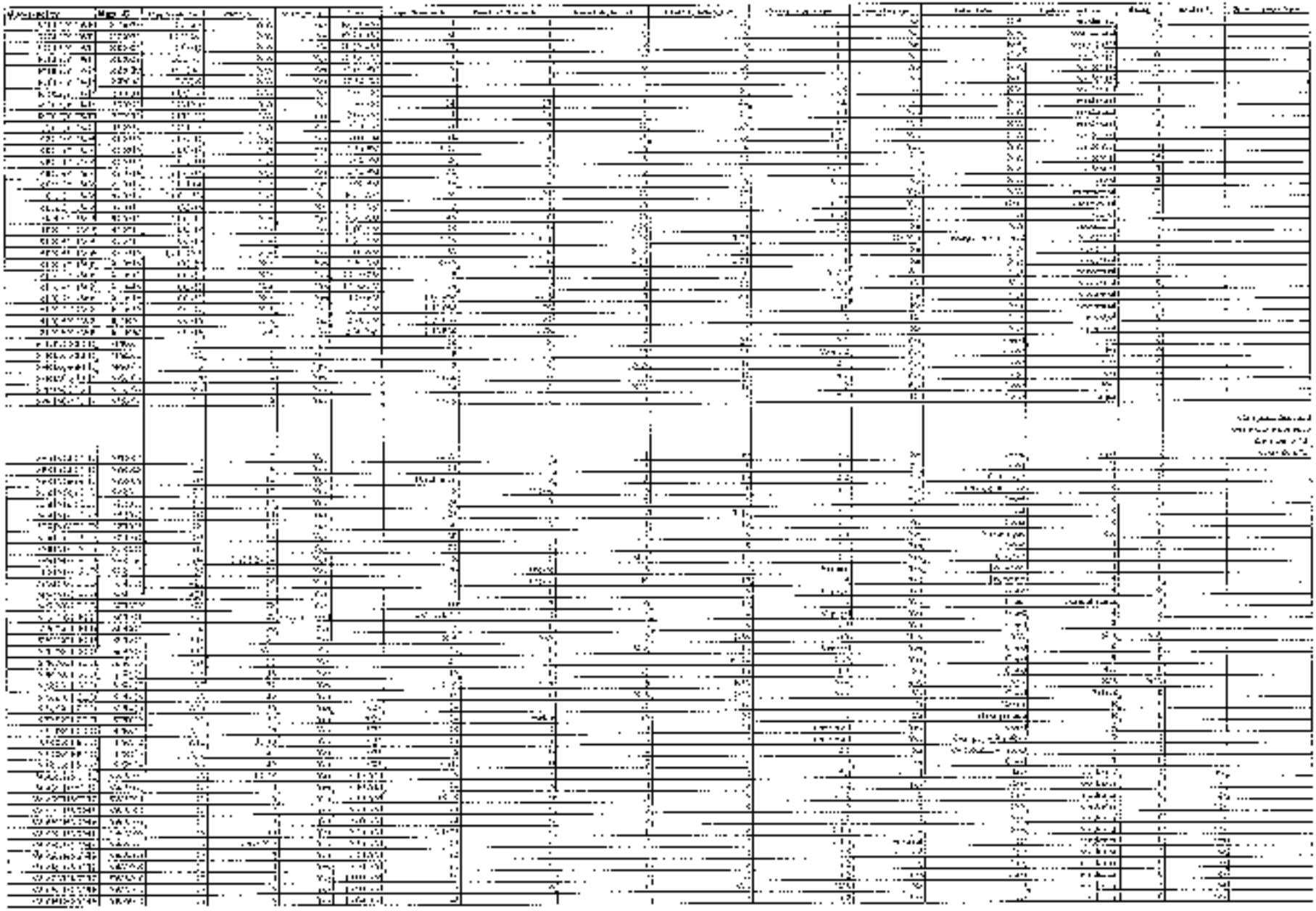


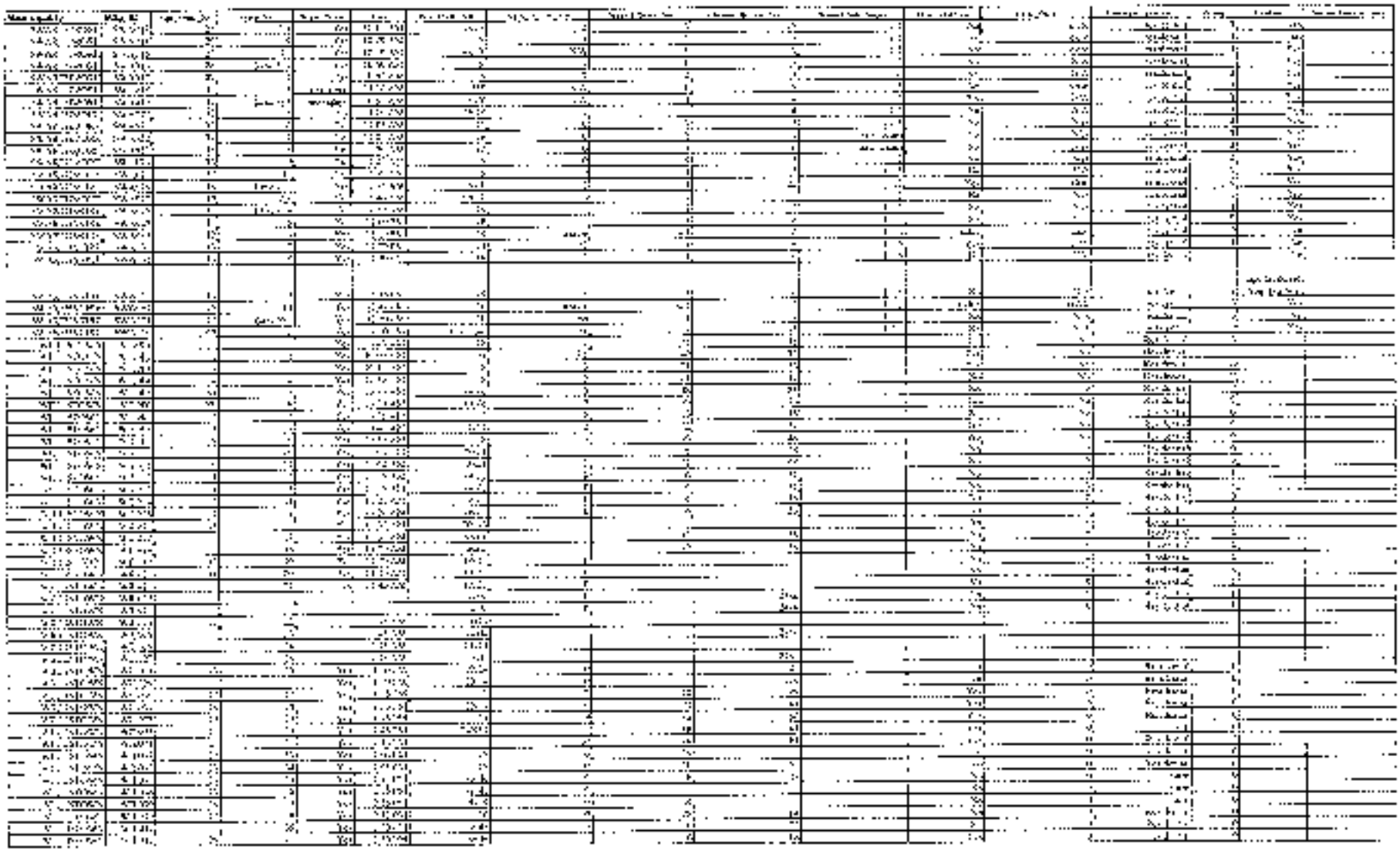
D. DATA COLLECTION FORMS (FORMS A, C – J, O)

Outfall Data Summary Forms

(Form O)







EASTTOWN TOWNSHIP

Easttown Township

BOARD OF SUPERVISORS
Edward M. Stregar, Jr., Chairman
Vincent J. Rogusky, Vice Chair
William F. Connor, III
James C. Spofford
Richard T. Frazier

566 Beaumont Road, PO Box 79, Devon PA 19333
Telephone: 610-687-3000 / Fax: 610-687-9666

July 20, 2005

Karen Holm
Delaware County Planning Commission
Government Center Building
201 West Front Street
Media, PA 19063-2751

Re: Crum Creek Watershed

Dear Ms. Holm:

Enclosed herewith please find the survey forms completed by Easttown Township for the Crum Creek Watershed for your review and use.

If you have any questions, please contact the undersigned or Surender Kohli

Sincerely,

Gene R. Williams.
Township Manager

Cc: Surender Kohli P.E.

Email: easttown@easttown.org
Website: www.easttown.org

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART 1 - GENERAL INFORMATION

Municipality: EASTTown Township

Contact Person: Gene R. Williams

WPAC Designee: Surenovr & Kohli

Title: Township Engineer

Address: 566 Beaumont Road

P. O. Box 79 Devon PA 19333

Phone: 610-687-3000

Fax: 610-687-9666

Person Completing form (if different from Contact Person):

Name:

Address:

Phone:

Fax:

E-mail:

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	✓	
Subdivision/Land Development Ordinance	✓	
Separate Stormwater Ordinance		
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors				
Municipal Engineering Department				
Municipal Planning Department	✓		✓	
County Planning Department	✓			
County Conservation District	✓			
Zoning Hearing Board				✓
Consulting Engineer	✓		✓	
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

zoning ordinance
subdivision/land development ordinance
Zoning MAP

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	1995		
Comprehensive Land Use Plan	2001		
Existing Land Use Maps		2005	
Proposed Land Use Maps		2005	
Zoning Maps		2005	

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	Y
Participates in FEMA Regular Program	Y

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

Form A

		STORM WATER PROBLEM AREAS FORM A						SHEET		OF				
WATERSHED	Crum Creek		FORM COMPLETED BY					Before Filling Out Form, See Instructions On Back						
Name:	Crum Creek		Name:											
Municipality:	[illegible] Township		Telephone:					For County Use:						
County:	Chester		Date:											
MAP NO. *		A-1	A-2	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems														
Flooding		X	X											
Accelerated Erosion		X	X											
Sedimentation														
Landslide														
Groundwater														
Water Pollution														
Other (Explain)														
Explanation Line No. (On Back)		1	2											
Cause (s)														
Storm Water Volume		X	X											
Storm Water Velocity														
Storm Water Direction														
Water Obstruction														
Other (Explain)														
Explanation Line No. (On Back)														
Frequency														
Year Most Recent Occurred		04	04											
Year First Known Occurred														
Regularity														
More Than 1 Year		X	X											
Less Than 1 Year														
Only During Agnes														
Duration (If Applicable)														
Less Than 1 Day		X	X											
1 Day + (Enter Days)														
Property Damage														
Loss of Life/Vital Services														
Private														
More Than One Owner														
Types of Properties														
Number of Properties														
Public (List Types)														
Explanation Line No. (On Back)														
Solutions														
Suggested														
Explanation Line No. (On Back)														
Formally Proposed														
Explanation Line No. (On Back)														

* Include Map ID No. if found on any other form listing proposed facilities.

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)". Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.

Use the explanation lines to list the types of public property damages (e.g. roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities.



Definitions

Storm Water Problem Area
An area that defines the furthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, wall, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

A-1	culvert size restriction
A-2	culvert size restriction

Eastown (50')

FORM B - OBSTRUCTION DATA COLLECTION SHEET 6 OF 15

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Eastown / Delaware

Records completed by: Brian Sweet

Field work personnel: _____

Date(s): 12/1 - 12/20/04

Dx Amount of ID | Dx = Diameter | HT = Height | W = Width | PW = Pier Width

Material: smry = Stone Masonry Structure; CMP = Corrugated Metal Pipe; CPP = Corrugated Polyethylene Pipe; SCCMP = Structurove Coated CMP; RCP = Reinforced Concrete Pipe; SP = Steel Pipe

Inlet Conditions: HW = Headwall; WW = Wingwall; SW = Sidewall

Map ID.	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Shape (✓): Culvert □	Culvert ○	Culvert ◯	Bridge ⌒	Bridge ⊓	T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
Sw-1	Darby Rd/ESE side		1					X			2.75	—	5	13	—	95	CMP / HW	Pipe [illegible]
Sw-2	Mrs Taylor's rd		1	✓						✓			5					No Obstruction
Sw-3	Wood's Drive N of		1					X			1.3	—	3.5	5	—	90	Stone / Fair, Low	Little Flow
Sw-4	Twin Lawn Dr		1				✓				2	3/3				90	MSry /	Small in - very silt
Sw-5	Woodsboro Rd		1					X			2	—	1.5	3.3	—	45	CMP / Hwy, Low	Low's have outfalls
[illegible]																		
Sw-6	Thumbrook Rd		1	✓					✓		1.8	—	*	10	—	90		
Sw-7	[illegible]		1														[illegible]	
Sw-8	Town Hall		2				2				2	*	—	—	—	90	[illegible]	
Sw-9	[illegible]			✓						✓	1.5	—	H	D	—	90	[illegible]	
Sw-10	[illegible]		2			2					1.5	—	H	D	—	90	Concrete / Hwy, Low	2 Culverts
Sw-11	[illegible]		2				2				3.3	3	—	—	—	90	[illegible]	See Sketch
Sw-12	2010 Valley Forge Rd		1					X			2	—	4	6	—	90	[illegible]	
[illegible]	[illegible]		1					X			2.5	—	3.5	5.4	—	90	[illegible]	To Stream
[illegible]																		
Sw-13	Brick Road Rd		1				X				2.5	1.5	—	—	—	90	CMP / Fair, Low	
Sw-14	Fox Hill		1				X				2.5	4	—	—	—	95	RCP / Ground	
Sw-15	Bridge to Woodsboro		1				X				1.3	2.5	—	—	—	90	RCP / Buried	Pool right into Inlet
Sw-16	Private Lane		2					X2										
[illegible]											1.5	—	3	H	—	90	[illegible]	Diagram
[illegible]																		
Sw-17	E Rd		1			✓	✓				1.8	2.3				90	SP / HW	
Sw-18	Private Lane		1			✓					1.5	—	3	4.5	—	90	MSry / Fair, Low	

Indy Effin (IRE)

FORM B - OBSTRUCTION DATA COLLECTION

SHEET ___ OF ___

Municipal Stream Obstruction Data

Watershed

Municipality/County:

Records completed by:

Field work personnel:

Date(s): 12/1 - 12/20/04

Map ID	Owner or Address Of Obstruction	Capacity (CMS)	Nos. of	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert ▭	Culvert ○	Culvert ⬭	Bridge ⌒	Bridge ⊓	Measurements: T (ft)	S (ft)	HT (ft)	W (ft)	RW (ft)	Skew (deg)	MATERIAL / INLET CONDITION	NOTES
EAF 21																		

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. NONE SHEET ____ OF ____

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: Crum Creek	Name: Surendra Kohli	Channel Excavation / Widening	Levee	Dams
Municipality: Ridley Twp	Telephone: 610-687-3000	Channel Realignment	Gabions	Floodwall
County: Chester	Date: 5/31/05	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C-						
C-						
C-						
C-						
C-						

FORM D

N/SW Proposed

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET OF

WATERSHED

Name: Crum
Municipality: Concord Twp
County: Chester

FORM COMPLETED BY

Name: Sarenda Kohli
Telephone: 610-687-3000
Date: 5/21/05

TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening	Levee	Dams
Channel Realignment	Gabions	Floodwall
Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complin. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET ____ OF ____

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Cream Municipality: Omit Twp County: Clarke	Name: Susan Kehl Telephone: 614-687-3000 Date: 5/31/05	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E- 1	Storm water Detention facility.	1995	jsmith@warrensburgh —	
E- 2	"	1995	"	
E- 3	"	1980	Pheasant Run	
E- 4	"	1996	Berwyn estate	
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

(Detention) Retention Basin

Natural Pond or Wetland

Parking Lot Pondling

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED FLOOD CONTROL PROJECT FORM F. SHEET OF

WATERSHED

Name: Crum

Municipality: Edgmont Twp

County: Chester

FORM COMPLETED BY

Name: Sue Kohl

Telephone: 610 687-3000

Date: 5/31/05

DEFINITION

Storm Water Control Facility

A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates Start	Proposed Constr. Dates End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F-		ASAP	Proposed			
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Pondling

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (Front)

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET ____ OF ____

WATERSHED Name: Crum creek
Municipality: Ridley Twp
County: Chester

FORM COMPLETED BY
Name: Serenda Kohl
Telephone: 610-849-5591
Date:

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-				None	available							
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

FORM 1

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET _____ OF _____

WATERSHED

Name: Crum Creek
Municipality: Aston
County: Chester

FORM COMPLETED BY

Name: Svende Kohl
Telephone: 610 649-3591
Date: -

For County Use:

FLOOD HAZARD AREA:

DEFINITION

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD.

no detail information available

Flooding occurs generally along the stream banks.

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1-				
1-				
1-				
1-				
1-				
1-				
1-				

Form J

		WATER QUALITY PROBLEM AREAS FORM J. SHEET ____ OF ____												
WATERSHED					FORM COMPLETED BY									
Name:	Crum Creek				Name:		Surendra Konli							
Municipality:	Aston Twp				Telephone:		610 687-8080							
County:	Chester				Date:		5/31/05							
SITE		J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	
Types of Water Quality Problems														
High Community Tolerance														
High Temperature														
High Turbidity														
Hydrocarbon Pollution														
Low Community Diversity														
Low Dissolved Oxygen														
Low pH														
Nutrient Enrichment														
Poor Habitat														
Other/Explanation Line No.														
Potential Cause(s)														
Agriculture														
Construction Site														
Erosion														
Lake Discharge														
STP Outfall														
Other/Explanation Line No.														
Frequency														
Year Most Recent Occurence														
Year First Known Occurence														
Source of Information														
County Water Quality Study														
Driveby														
Other/Explanation Line No.														
		EXPLANATION LINES												
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

No information available for water quality problem.

Form O - Outfall Data

Person: Spencer Kelly Date: _____ Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain _____

Municipality: Upper Townsend Name of receiving water. Crum Creek.

No field work has been conducted to date. This information will be obtained during 2005 - 2006 years

Pipe Swale #	Photo #	Storm Drain? Yes-No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if float algae or sediment present)	Describe land upstream drain area.	Rating (0-2)

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Easttown Township

Easttown Township

566 Beaumont Road, PO Box 79, Devon, PA 19333
Telephone: 610.687.3000
Fax: 610.687.9666

FAX TRANSMITTAL

DATE: 12/6/04

SEND TO: Bill Brannan FAX #: 610-837-5918

FROM: Suzanne Kell. FAX#: 610.687.9666
EASTTOWN TOWNSHIP PHONE #: 610.687.3000

PAGES: 2 (including cover)

ORIGINAL: [ ] WILL BE MAILED [X] WILL NOT BE MAILED

COMMENTS:

If you do not receive the complete number of pages indicated or there is a problem with the transmission of this fax, please call 610.687.3000. Thank you.

Easttown Township

566 Beaumont Road, PO Box 79, Devon, PA 19333
Telephone: 610.687.3000
Fax: 610.687.9666

FAX TRANSMITTAL

DATE: 12/6/04

SEND TO: Bill Brokaw FAX #: 610-837-5918

FROM: Surendra Kilambi
EASTTOWN TOWNSHIP

FAX#: 610.687.9666
PHONE #: 610.687.3000

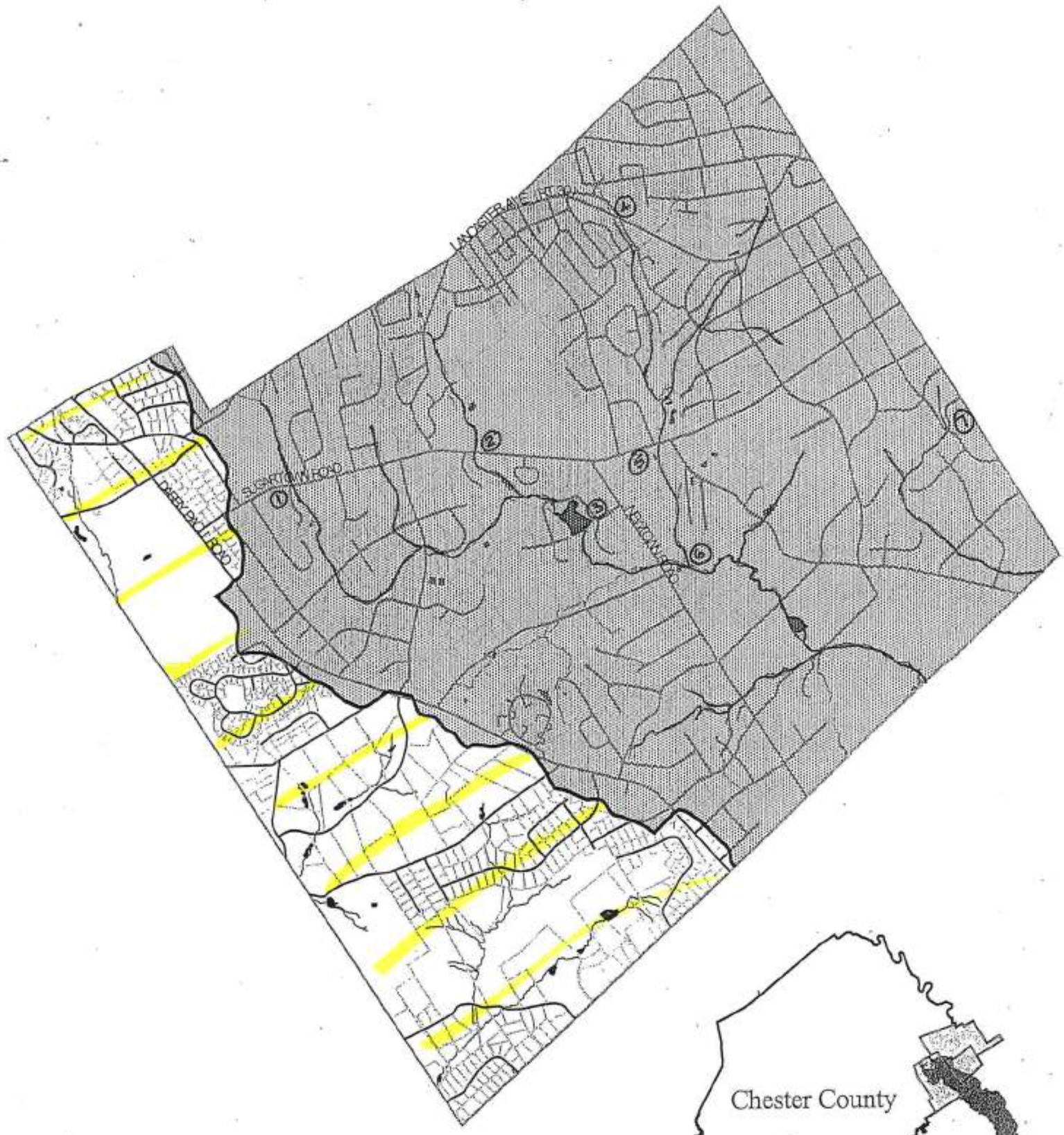
PAGES: 2 (including cover)

ORIGINAL: [ ] WILL BE MAILED [x] WILL NOT BE MAILED

COMMENTS:

If you do not receive the complete number of pages indicated or there is a problem with the transmission of this fax, please call 610.687 3000. Thank you.

Crum Creek Watershed
Easttown Township





- Crum Creek Watershed
- Municipal Boundary
- Roads
- Land Parcels
- Municipal Area Outside the Crum Creek Watershed
- Rivers and Streams
- Ponds and Lakes

N

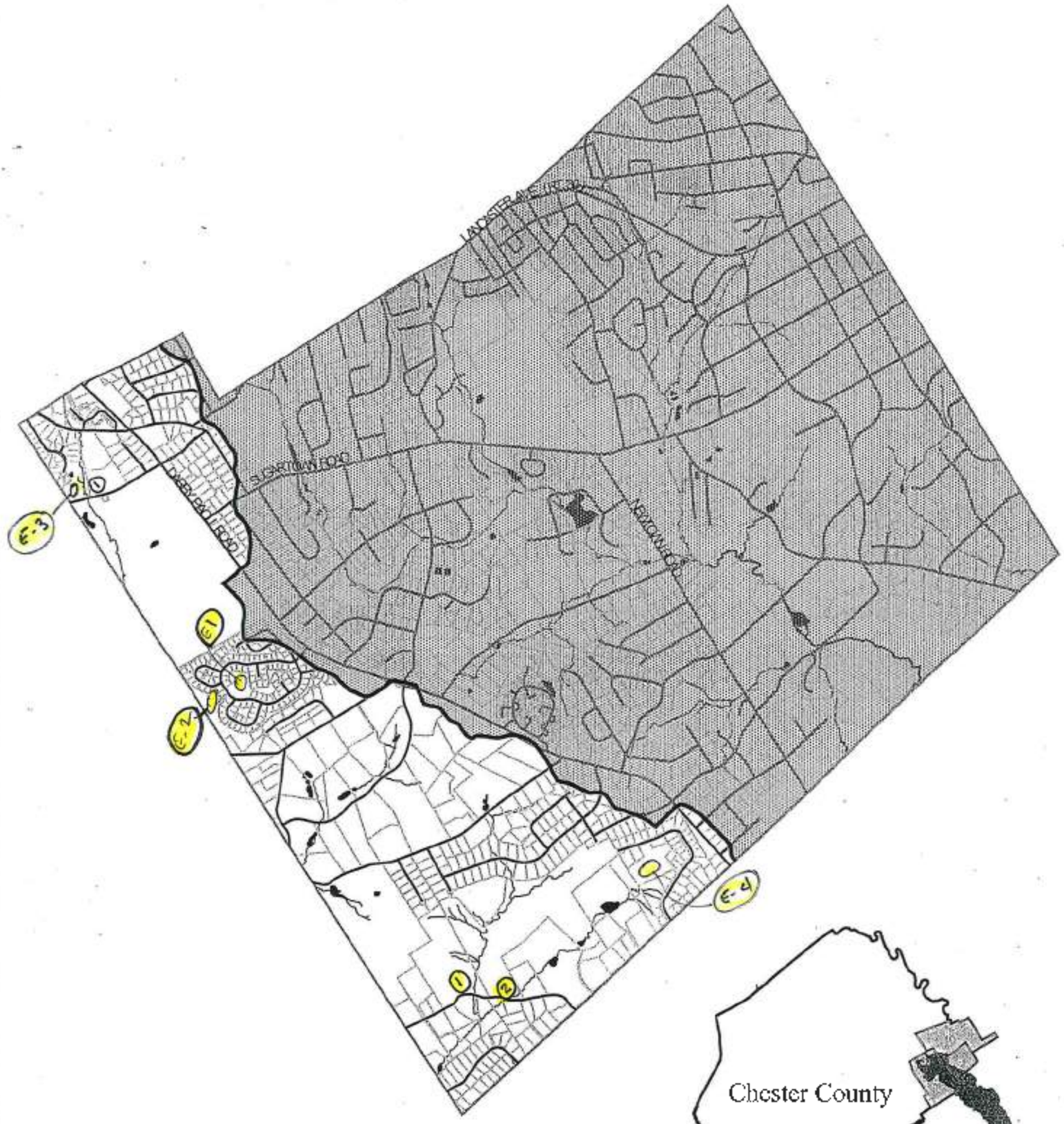
0.4 0 0.4 0.8 Miles

1:25344

1 inch = 0.4 mile

CCPC, 2003

Crum Creek Watershed
Easttown Township





- Crum Creek Watershed
- Municipal Boundary
- Roads
- Land Parcels
- Municipal Area Outside the Crum Creek Watershed
- Rivers and Streams
- Ponds and Lakes

N

0.4 0 0.4 0.8 Miles

1:25344

1 inch = 0.4 mile

CCPC, 2003

EDDYSTONE TOWNSHIP

Borough of Eddystone

August 25, 2005

Ms. Karen Holm
Delaware County Planning Department
Government Center Building
201 W. Front Street
Media, PA 19063

RE: Crum Creek Watershed
Act 167 Stormwater Management Plan

Dear Ms. Holm:

Enclosed please find the completed questionnaire on the subject project.

Very truly yours.

Brian Lauer
Borough Secretary

BL/pm
Enclosure (1)
cc: CEA File No 82800-115-CCW

1300 East Twelfth Street • Eddystone, Pennsylvania 19022 • (610) 874-1100 • Fax (610) 874-1605

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us

PART I - GENERAL INFORMATION

Municipality: Eddystone Borough

Contact Person: Brian Lauer, Borough Secretary

WPAC Designee: Charles J. Catania

Title: Borough Engineer

Address: 520 W. MacDade Boulevard

Milmont Park, PA 19033-3311

Phone: 610-532-2884

Fax: 610-532-2923

Person Completing form (if different from Contact Person):

Name: Jamie H. Bricker

Address: 520 W. MacDade Boulevard

Milmont Park, PA 19033-3311

Phone: 610-532-2884

Fax: 610-532-2923

E-mail: jamie@cataniaengineering.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	Chapter 295	
Subdivision/Land Development Ordinance	N/A	
Separate Stormwater Ordinance	No. 609	
Separate Floodplain Ordinance	N/A	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors	X	X		
Municipal Engineering Department				
Municipal Planning Department	X		X	
County Planning Department	X		X	
County Conservation District	X	X		
Zoning Hearing Board			X	X
Consulting Engineer	X		X	
Others (List Below				

C. Please provide **copies** of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

Zoning Chapter 295

Stormwater Management Ordinance No. 609 (Crum Creek Act 167 Ordinance – not included)

Zoning Map – Borough of Eddystone (4/19/04)

PART III – MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	May 2005		
Comprehensive Land Use Plan	April 2004		
Existing Land Use Maps	April 2004		
Proposed Land Use Maps	April 2004		
Zoning Maps	April 2004		

PART IV – FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	N
Participates in FEMA Regular Program	Y

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form: A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identified to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

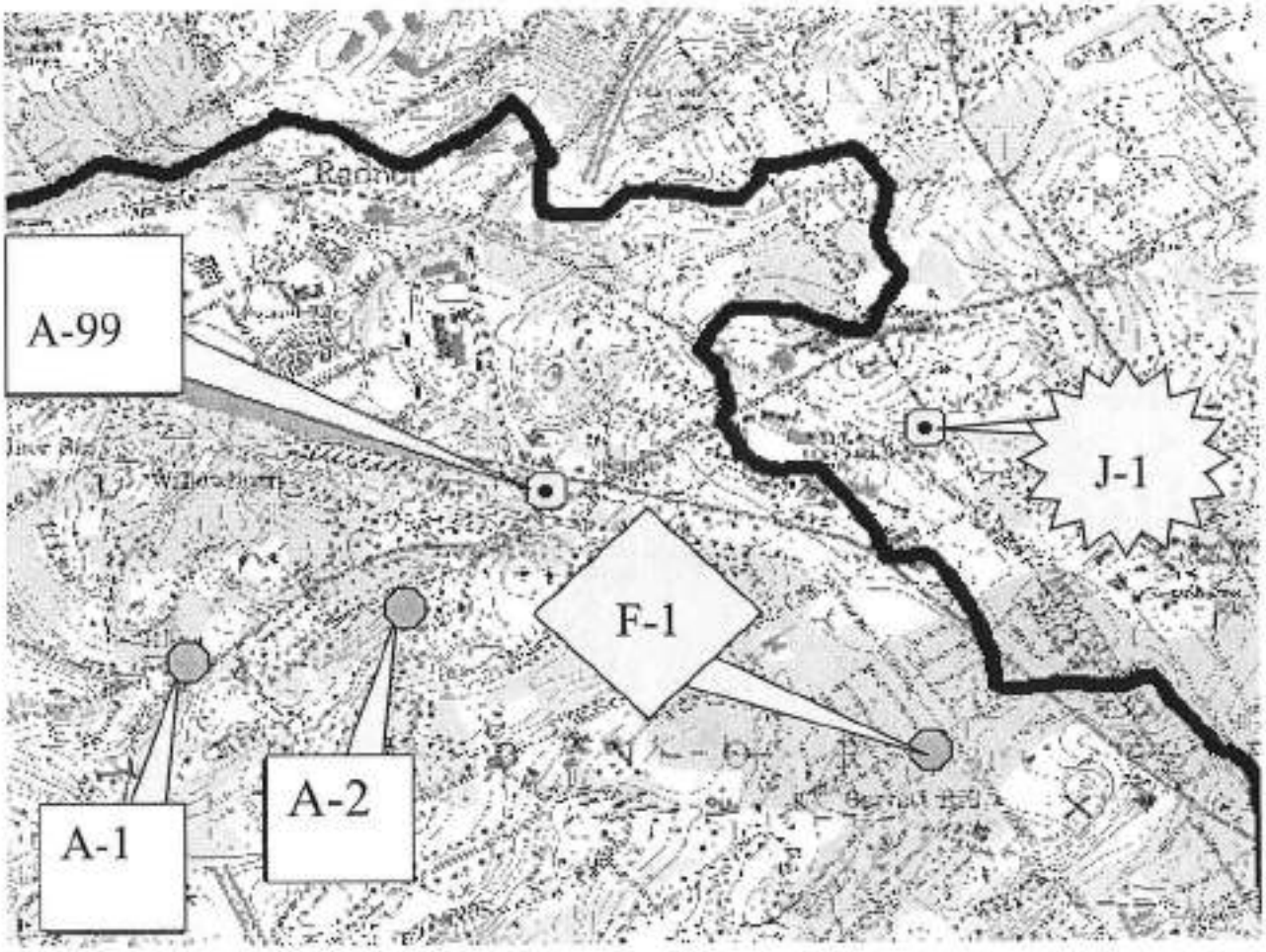
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



FORM A - STORM WATER PROBLEM AREAS SHEET 2 OF 2

EXPLANATION LINES

1	CC flooding at Chester Pike bridge
2	CC flooding on Boeing's site, formally proposed floodwall to alleviate

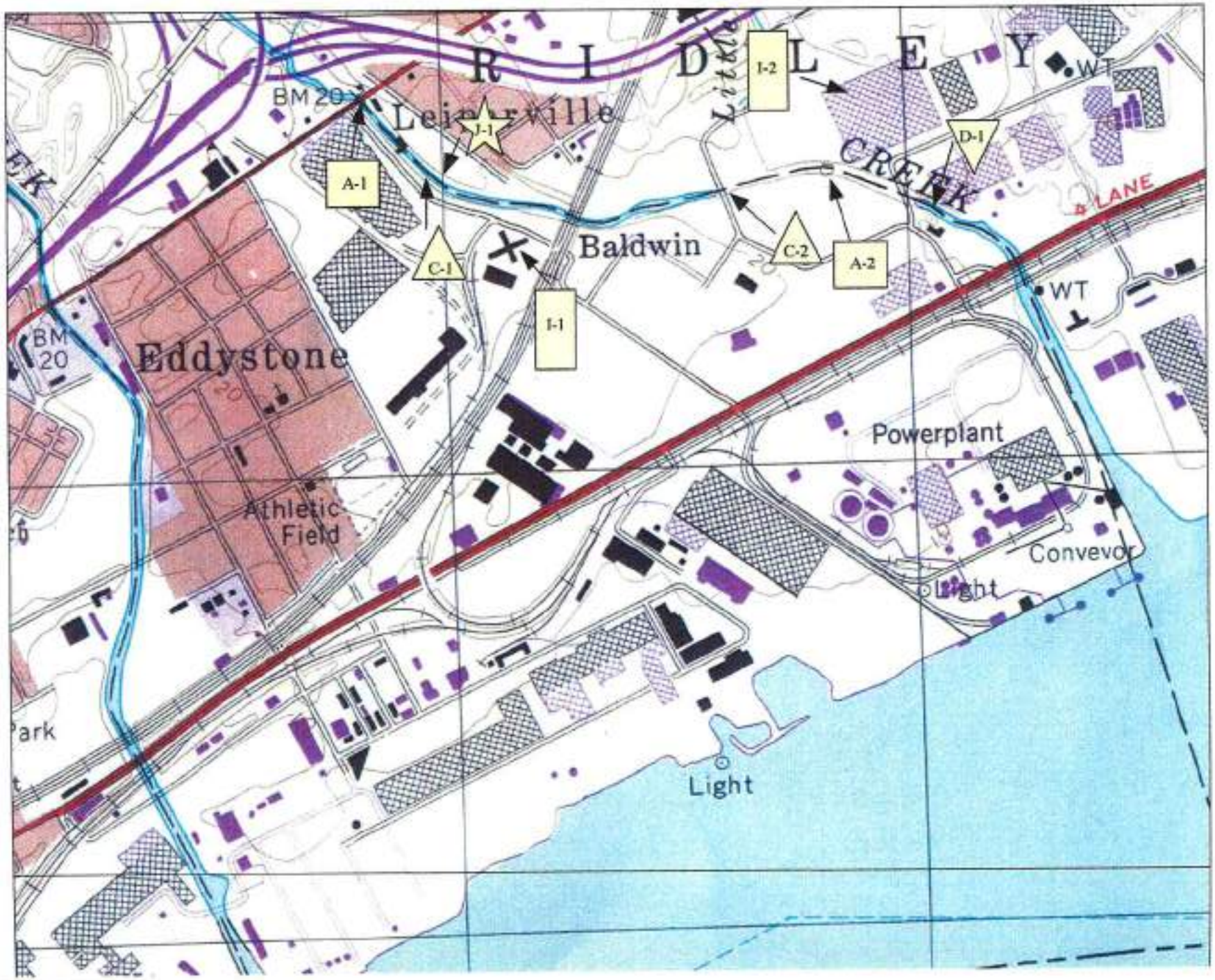
FORM A - STORM WATER PROBLEM AREAS SHEET 1 OF 2

WATERSHED		FORM COMPLETED BY		Before Filling Out Form, See Instructions on Back
Name:	Crum Creek	Name:	Jamie H Bricker	
Municipality:	Eddystone Borough	Telephone.	610-532-2884	For County Use:
County.	Delaware	Date.	8/24/2005	

MAP NO. *	A-1	A-2	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems												
Flooding	X	X										
Accelerated Erosion												
Sedimentation												
Landslide												
Groundwater												
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)	1	2										
Cause (s)												
Storm Water Volume	X	X										
Storm Water Velocity												
Storm Water Direction												
Water Obstruction	X											
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	2003	2002										
Year First Known Occurred	?	?										
Regularity												
More Than 1 Year												
Less Than 1 Year	X	X										
Only During Ages												
Duration (If Applicable)												
Less Than 1 Day	X											
1 Day + (Enter Days)												
Property Damage												
Loss of Life/Vital Services												
Private		X										
More Than One Owner												
Types of Properties		Ind										
Number of Properties		1										
Public (List Type)	X											
Explanation Line No. (On Back)	1											
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed		X										
Explanation Line No. (On Back)		2										

* Include Map ID No. if found on any other form listing proposed facilities.

Eddystone Borough Crum Creek Act 167 Map



FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name	Jamie H. Bricker
Municipality	Eddystone Borough	Telephone:	610-532-2884
County:	Delaware	Date:	8/24/2005

TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening	Levee	Dams
Channel Realignment	Gabions	Floodwall
Rock Riprap	Pipe Channe	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs	Design Flood		Owner Name, Address, and Phone
				Frequency Yrs	Discharge C.F.S (if known)	
C-1	Stone Channel Walls	?	?	?	?	?
C-2	Concrete Box Culvert	?	?	?	?	The Boeing Company (Dale Davis) (610) 591-2005 P.O. Box 16858 P25-75 Philadelphia, PA 19142-0858
C-						
C-						
C-						

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Jamie H. Bricker	Channel Excavation / Widening	Levee	Dams
Municipality:	Eddystone Borough	Telephone:	610-532-2884	Channel Realignment	Gabions	Floodwall
County:	Delaware	Date:	8/24/2005	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complin Date	Expected Life Yrs.	Design Flood		Map ID No Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-1	floodwall		X		2004/ 2005	2005	100	100-yr.	10335	A-2	The Boeing Company (Dale Davis) P.O Box 16858 P25-75 Philadelphia, PA 19142-0858 (610) 591-2005
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		DEFINITION
Name:	Crum Creek	Name:	Jamie H. Bricker	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
Municipality:	Eddystone Borough	Telephone:	610-532-2884	
County:	Delaware	Date:	8/24/2005	
For County Use:				

Map ID No	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-	No stormwater control facilities exist in the Crum Creek Watershed boundaries of Eddystone Borough.			
E-				
E-				
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED STORM WATER CONTROL FACILITIES FORM F, SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		DEFINITION
Name:	Crum Creek	Name	James H. Bricker	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
Municipality	Eddystone Borough	Telephone:	610-532-2884	
County	Delaware	Date:	8/24/2005	

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Date Start	Proposed Constr. Date End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F-	No stormwater control facilities are proposed within Eddystone Borough.					
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the stormwater problem area's Map ID No., if the proposed project will solve or reduce and / all of an identified drainage problem

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin
Natural Pond or Wetland
Parking Lot Ponding
Roof Top Storage
Semi Pervious Paving
Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Jamie H. Bricker
Municipality:	Eddystone Borough	Telephone:	610-532-2884
County:	Delaware	Date:	8/24/2005

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-	NONE											
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

*See measurement key on reverse side

FORM H

PROPOSED FLOOD CONTROL PROJECT FORM H.

SHEET 1 OF 1

WATERSHED

Name: Crum Creek
Municipality: Eddystone Borough
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/24/2005

INSTRUCTIONS

On the map for proposed stormwater collection systems, diagram each proposed system. Indicate a map point to show changes in system elements, pipe size, pipe direction and connections to existing systems. For proposed additions to existing systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed, new system and one for each existing system having one or more proposed additions. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each separate system on 20 numbers higher (ex. H-3 ends one system, begin the next with H-23). Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system form and map. See Sample Diagrams and Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Map I.D Nos.**	Proposed Constr. Dates		Design Data Available	Contact Person	Name of Final Ownership and
					Pipe	Channel / Swale									
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End		Name and Phone	Maintenance Responsibility
H-	H-	NONE													
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														

*See measurement key on reverse side. **Enter the stormwater problem areas' Map I.D. Nos., if proposed project will solve or reduce any / all of the drainage problems.

FORM

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM I SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		DEFINITION
Name:	Crum Creek	Name:	Jamie H. Bridker	FLOOD HAZARD AREA A normally dry land area that has been or is susceptible to being inundated by the 100-year flood
Municipality:	Edgystone Borough	Telephone:	610-532-2884	
County	Delaware	Date:	8/24/2005	
For County Use:				

Map ID No	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 - 1	Baldwin Towers		Baldwin Office Associates 1001 E Hector St Ste 100 Conshohocken, PA 19428	
2	Boeing		Boeing Company P O. Box 16858 P25-75 Philadelphia, PA 19142-0858	
1-				
1-				
1-				
1-				
1-				

Form J

WATER QUALITY PROBLEM AREAS FORM J.										SHEET 1 OF 1
WATERSHED				FORM COMPLETED BY						
Name:	Crum Creek			Name:	Jamie H Bricker					
Municipality:	Eddystone Borough			Telephone:	610-532-2884					
County:	Delaware			Date:	8/24/2005					
SITE	J-1	J-	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems										
High Community Tolerance	X									
High Temperature										
High Turbidity										
Hydrocarbon Pollution										
Low Community Diversity										
Low Dissolved Oxygen										
Low pH										
Nutrient Enrichment										
Poor Habitat	X									
Other/Explanation Line No.										
Potential Cause(s)										
Agriculture										
Construction Site										
Erosion										
Lake Discharge										
STP Outfall										
Other/Explanation Line No.	1									
Frequency										
Year Most Recent Occurrence	2004									
Year First Known Occurrence	?									
Source of Information										
County Water Quality Study										
Drivebys	X									
Other/Explanation Line No.										

EXPLANATION LINES
1 below Chester pike, lined channel, rubbish in stream, heavy silt
2
3
4
5
6
7
8
9

Form O - Outfall Data

Person: Jamie H. Brecker Date: 8/24/05 Time Since Last Rain was > 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches > 0.1 inches Days Since Last Rain: Five (8/19/05)

Municipality: Eddystone Borough Name of Receiving water: Crum Creek

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
None												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, stain, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basin or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Eddystone Borough does not have any storm sewers or outfalls in the Crum Creek watershed

J – 1 Crum Creek, below Chester Pike





MALVERN BOROUGH

EDWARD B. WALSH & ASSOCIATES, INC.
Complete Civil Engineering Design / Consultation Services

March 23, 2004

Mr. Justin D. Kauffman, Environmental Planner
Delaware County Planning Department
Government Center Building
201 West Front Street
Media, PA 19063-2751

Re: Crum Creek Act 167 Stormwater Management Plan
Outfall Map
Malvern Borough

Dear Mr. Kauffman:

Enclosed please find two (2) copies of the outfall map for Malvern Borough in accordance with your request (letter dated February 19, 2004). As discussed with Karen Holm from your office, we have not completed the Form O – Outfall Data worksheet to date. It is our intention to gather that information during the screening process of the outfall locations.

Also as discussed with Ms. Holm, please copy myself on future request for information associated with Malvern Borough involvement in the Act 167 Plan.

If you should have any questions or require any additional information, please do not hesitate to contact me.

Very truly yours,
EDWARD B. WALSH & ASSOCIATES, INC.
Malvern Borough Engineers

Daniel H. Daley, P.E.

encl.

cc: Sandra L. Kelley, Borough Manager, w/o encl.

REGISTERED PROFESSIONAL ENGINEERS - PA, NJ, DE & MD
55 Country Club Drive, Suite 100 Downingtown, PA 19335
610-518-1360 FAX 610-518-1255

EDWARD B. WALSH & ASSOCIATES, INC.
Complete Civil Engineering Design / Consultation Services

September 16. 2004

Delaware County Planning Department
Attn. Ms. Karen Holm
Government Center Building
201 West Front Street
Media, PA 19063-2751
Phone (610) 891.5200

RE: Crum Creek Watershed Act 167 Plan
Malvern Borough, Chester County

Dear Ms. Holm:

On behalf of Malvern Borough, enclosed please find one (1) copy of the completed survey forms provided by your office. If you should have any questions or require any additional information, please do not hesitate to contact me.

Very truly yours,
EDWARD B. WALSH & ASSOCIATES. INC.
Malvern Borough Engineers

Daniel H. Daley, P.E.

cc: Sandra L. Kelley, Malvern Borough

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610 891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: MALVERN BOROUGH

Contact Person: SANDRA L. KELLEY

WPAC Designee: SANDRA L. KELLEY

Title: BOROUGH MANAGER

Address: ONE EAST FIRST AVENUE - SUITE 3
PO BOX 437 MALVERN PA 19355

Phone: 610. 644. 2602

Fax: 610. 644. 4504

Person Completing form (if different from Contact Person):

Name: DANIEL DALEY, PE - BOROUGH ENGINEER

Address: E.B. WALSH & ASSOC., INC., 55 COUNTRY CLUB DR. -
SUITE 100, DOWNINGTOWN PA 19335

Phone: 610. 518. 1360

Fax: 610. 518. 1255

E-mail: ddaley@ebwalshinc.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	X	
Subdivision/Land Development Ordinance	X	
Separate Stormwater Ordinance		
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

BOROUGH COUNCIL

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
~~Supervisors~~		X		X
Municipal Engineering Department				
Municipal Planning Department				
County Planning Department	X			
County Conservation District	X			
Zoning Hearing Board			X	X
Consulting Engineer	X		X	
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

ZONING ORDINANCE (TABLE OF CONTENTS ONLY) - 2003*

ZONING MAP

SLDO (SELECT SECTIONS) - 1973*

[NOTE MALVERN BOROUGH IN PROCESS OF SLDO REWRITE]

* IF COMPLETE COPY NEEDED - PLEASE CONTACT S. KELLEY @ BOROUGH

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	1993		
Comprehensive Land Use Plan	1999		
Existing Land Use Maps	1999		
Proposed Land Use Maps	1999		
Zoning Maps	2003		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	?
Participates in FEMA Emergency Program	?
Participates in FEMA Regular Program	?

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-1) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

Place the location of the problem area on the map as shown in the attached example map

- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area
- Repeat with the next problem area (A-2) and so on

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

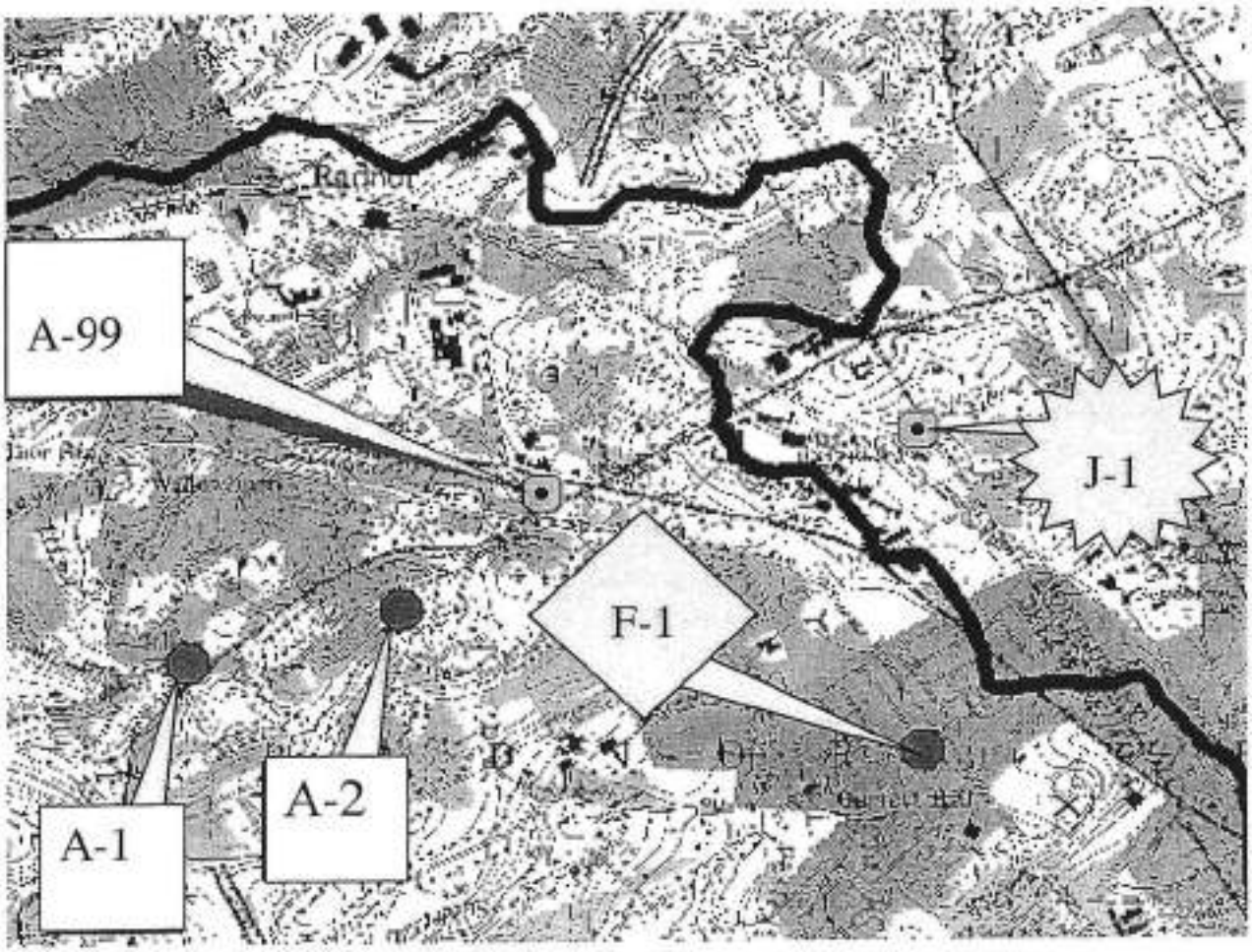
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide <u>detailed</u> descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



STORM WATER PROBLEM AREAS - FORM A sheet __ of __

WATERSHED
Name: GRUM CREEK
Municipality: MALVERN
County: CHESTER

FORM COMPLETED BY
Name: DANIEL H. DALEY, P.E. - BOROUGH EGR.
Telephone: 610.518.1360
Date: 09-15-04

MAP NO.	A-99	A-1	A-2	A-3	A-4	A-5	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems													
Flooding	x	X	X	X	X								
Accelerated Erosion	x			X		X							
Sedimentation													
Landslide													
Groundwater		X											
Water Pollution	x												
Other (Explain)													
Explanation Line No.(s)													
Cause(s)													
Storm Water Volume	x	X	X	X	X	X							
Storm Water Velocity	x		X	X	X	X							
Storm Water Direction	x		X	X	X								
Water Obstruction	x	X											
Other (Explain)													
Explanation Line No.(s)													
Frequency													
Year Most Recent Occurred													
Year First Known to Occur													
Regularity													
More Than 1/Year	x	X	X	X	X	X							
Less Than 1/Year													
Only During Agnes Flood													
Duration (If Applicable)													
Less Than One Day	x	X	X	X	X	X							
One Day + (Enter Days)													
Property Damages													
Loss of Life / Vital Services													
Private													
More Than One Owner													
Types of Properties													
Undeveloped													
Agricultural													
Residential			X	X									
Commercial	x												
Industrial													
Number of Properties													
1													
2-10	x												
11+													
Public (List Types)					X STREET	X PARK							
Explanation Line No.(s)													
Solutions													
Suggested													
Explanation Line No.(s)	1	1	2	3	4	5							
Formally Proposed													
Explanation Line No.(s)													

EXPLANATION LINES

1 A-1 FLOOD OF ROADWAY - UNDERSIZED CULVERT (LOCATED IN WILLISTOWN TWP.)
2 A-2 BOROUGH HAS RECEIVED COMPLAINT RE. STORMWATER DISCHARGE - CONCENTRATED FLOW
3 A-3 BORO. RECEIVED COMPLAINTS RE. STORMWATER FLOWS (NO STORMSEWER EXISTS IN ROAD)
4 A-4 CONCENTRATED POINT DISCHARGE OF PIPE ONTO WARREN AVE. - NO ROADSIDE SWALE OR STORM SEWER EXISTS

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)" Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.

Use the explanation lines to list the types of public property damages e.g. roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed actions



Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any pike, bridge, culvert, wall, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

5	POTENTIAL STREAM CHANNEL EROSION (MINOR) IN TOWN PARK-LAND

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET _____ OF _____

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: CRUM CREEK	Name: DAN DALEY	Channel Excavation / Widening	Levee	Dams
Municipality: MALVERN	Telephone: 610.518.1360	Channel Realignment	Gabions	Floodwall
County: CHESTER	Date: 09-15-04	Rock Riprap	Pipe Channel	Concrete Lining

For County Use.

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (If known)	Owner Name, Address, and Phone
C-1	STORM SEWER OUTLET & RIP-RAP ENERGY DISSAPATOR	EARLY 2000?			?	MALVERN BOROUGH
C-						
C-						
C-						
C-						

FORM D

NO PROPOSED FLOOD CONTROL PROJECTS ANTICIPATED.

PROPOSED FLOOD CONTROL PROJECT FORM D SHEET _____ OF _____

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: CRUM CREEK	Name: D. DALEY	Channel Excavation / Widening	Levee	Dams
Municipality: MALVERN	Telephone: 610.518.1360	Channel Realignment	Gabions	Floodwall
County: CHESTER	Date: 09-15-04	Rock Riprap	Pipe Channel	Concrete Lining

For County Use.

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complt. Date	Expected Life Yrs	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No.. If the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E

SHEET ____ OF ____

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: CRUM CREEK Municipality: MALVERN County: CHESTER	Name: D. DALEY Telephone: 610.518.1360 Date: 09.15.04	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E- 1	DETENTION BASIN	MODIFIED 2003	MALVERN PREP SCHOOL (PRIVATE)	
E-				
E- 2	DETENTION BASIN	2002	VILLAGE OF PENNWICK HOMEOWNERS ASSOC.	LOCATED IN WILLISTOWN (DEVELOPMENT
E- 3	DETENTION BASIN WITH INFILTRATION TRENCH	2002-03	MALVERN RETREAT HOUSE CHARLES BURGY 313 S. WARREN AVE. MALVERN PA 19355	w/i MALVERN BOROUGH)
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage /

PROPOSED FLOOD CONTROL PROJECT FORM F. SHEET _____ OF _____

WATERSHED

Name: CRUM CREEK
Municipality: MALVERN
County: CHESTER

FORM COMPLETED BY

Name: D. DALEY
Telephone: 610.518.1360
Date: 09-15-04

DEFINITION

Storm Water Control Facility

A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use.

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates Start	End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F- 1	BASIN - DETENTION	01-05	08-05		REMED RECOVERY CARE CENTER (PRIVATE OWNER)	(PROPOSED INSTITUTIONAL HOME & PARKING LOT)
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

- Detention / Retention Basin
- Natural Pond or Wetland
- Parking Lot Ponding
- Roof-Top Storage
- Semi-Pervious Paving
- Infiltration Device (Seepage / Recharge Basin or Underground Tank)

COLLECTION FACILITIES HAVE NOT BEEN MAPPED BY BOROUGH TO DATE.

FORM G

EXISTING STORM WATER COLLECTION FACILITIES FORM G.

SHEET ____ OF ____

WATERSHED

Name: CRUM CREEK

Municipality: MALVERN

County: CHESTER

FORM COMPLETED BY

Name: D. DALEY

Telephone: 610.518.1360

Date: 09-13-04

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements: pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

(NO PROPOSED FACILITIES)

PROPOSED STORM WATER COLLECTION FACILITIES FORM F (10 YRS)

SHEET ____ OF ____

WATERSHED

Name: CRUM CREEK

Municipality: MALVERN

County: CHESTER

FORM COMPLETED BY

Name: D. PALEY

Telephone: 610.535.1360

Date: 09-15-04

INSTRUCTIONS

On this map, for proposed storm water collection system, show proposed inlets, manholes, pipe sizes, pipe slopes and connections to existing system. For proposed channels or swales, indicate the location and type of construction (concrete, stone, grass, etc.) and size. Complete a separate number for each proposed new system and connection to each existing system having out of basin drainage, existing flooding problems, or that will receive additional flow from the proposed system. Identify the point where proposed system connects to existing system, using the map point number from the existing system form and map. See Sample Drawings and Procedure Section.

Map I.D. No.		System's Elements (2)			Measurements *					Map I.D. Nos.**	Proposed Const. Dates		Design Data	Contact Person Name and	Name of Pvt. Ownership and/or
					Pipe	Open Channel / Swale			Material						
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Avail.	Phone	Maintenance Responsibility
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														

* See measurement key on reverse side. ** Enter the storm water problem areas Map I.D. Nos. if proposed project will solve or reduce any / all of the drainage problems.

NO KNOWN DEVELOPMENT (W/I MALVERN) — IN FHA. FORM 1

NO PROPOSED/PROJECT IN FHA

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET _____ OF _____

WATERSHED

Name: CRUM CREEK

Municipality: MALVERN

County: CHESTER

FORM COMPLETED BY

Name: D. DALEY

Telephone: 610.518.1360

Date: 09-15-04

For County Use:

DEFINITION

FLOOD HAZARD AREA:

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name Address and Phone	Comments
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				

NO KNOWN WATER QUALITY PROBLEMS W/: MALVERN BOROUGH (NO TESTING OR OBSERVATION OCCURRED)

WATER QUALITY PROBLEM AREAS (FORM J)

Watershed

Name: CRUM CREEK
Municipality: MALVERN
County: CHESTER

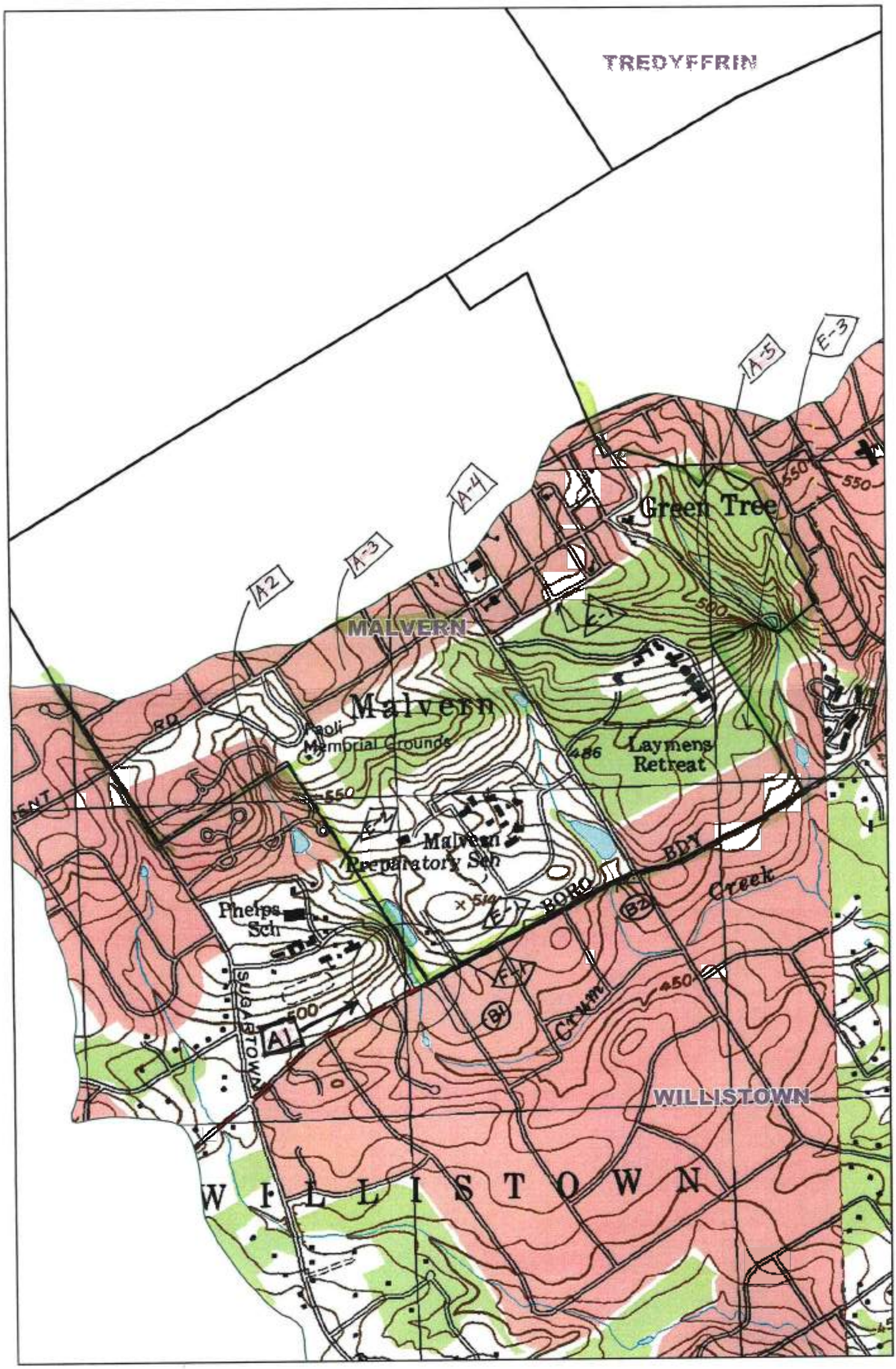
Form Completed By

Name: DAN DALEY
Telephone: 610.518.1360
Date: 09-15-04

Site:	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems								
High Community Tolerance								
High Temperature								
High Turbidity								
Hydrocarbon Pollution								
Low Community Diversity								
Low Dissolved Oxygen								
Low pH								
Nutrient Enrichment								
Poor Habitat								
Other / Explanation Line No.								
Potential Causes(s)								
Agriculture								
Construction Site								
Erosion								
Lake Discharge								
STP Outfall								
Other / Explanation Line No.								
Frequency								
Year Most Recent Occurrence								
Year First Known Occurrence								
Source of Information								
Streamwatch								
County Water Quality Study								
Driveby								
CCD Complaint Investigation								
Other / Explanation Line No								

Explanation Lines

1. _____
2. _____
3. _____



CRUM CREEK WATERSHED - LOCATOR MAP

MARPLE TOWNSHIP

Marple Twp (MAR)

FORM B - OBSTRUCTION DATA COLLECTION SHEET 14 OF _____

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Marple / Delaware

Records completed by: Ryan Bond

Field work personnel: _____

Date(s): 12/1 - 12/30/04

T= Amount of fill; Dia= Diameter; HT = Height; W = Width; PW = Pier Width

Material: masy = Stone Masonry Structure; CMP = Corrugated Metal Pipe; CPP = Corrugated Polyethylene Pipe; ECCMP = Bituminous Coated CMP; RCP = Reinforced Concrete Pipe; SP = Steel Pipe

Inlet Conditions: HW = Headwall; WW = Wingwall; SW = Sidewall

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Shape (✓): Culvert □	Shape (✓): Culvert ○	Shape (✓): Culvert ⬭	Shape (✓): Bridge ⌒	Shape (✓): Bridge ⊓	Measurements: T (ft)	Measurements: D (ft)	Measurements: HT (ft)	Measurements: W (ft)	Measurements: PW (ft)	Measurements: skew angle	MATERIAL / INLET CONDITION	NOTES
MAR 1																		
MAR 2																		
MAR 3																		
MAR 4							✓				4	2	–	–	–	90	RCP/HW	
MAR 5											1.5	2	–	2	20	–	90	Concrete
MAR 6				✓		✓			✓		4	–	2	5	–	90	Concrete	
MAR 7							✓				2	5	–	–	–	90	RCP / HW	
MAR 8							✓				4	3	–	–	–	90	RCP / HW	
MAR 9							✓				2	2.5	–	5	–	90	CMP / HW	Wing Corrected
MAR 10						✓					3.5	2.3	–	4.2	–	90	Concrete / Stone	Channel is Paved
MAR 11							✓				3.5	2	–	–	–	90	RCP - HW/WW	
MAR 12							✓				3.5	2	–	–	–	90	RCP	
MAR 13						✓					4.5	–	4.5	6	–	90	Stone/ RCP HW	
MAR 14				✓					✓		5	–	6.3	10	–	90	Concrete/Stone	
MAR 15							✓				3	4	–	–	–	90	CMP / HW	Very Corroded
MAR 16				✓					✓		2	3	–	6	20	–	90	Concrete
MAR 17							✓				2	3	–	–	–	90	CMP / HW	
MAR 18							✓				2	3	–	–	–	90	RCP / HW	
MAR 19							✓				3	4	–	–	–	90	CMP / HW	
MAR 20							✓				6.5	4	–	–	–	90	CMP / HW	
MAR 21				✓					✓		3	–	3	20	–	90	Concrete / Stone	
MAR 22									✓		5	–	4	30	–	90	Concrete	
MAR 23						✓					8	–	4	6	–	90	Concrete / HW	
MAR 24								✓			2	–	4.5	6	–	90	CMP / HW	pier
MAR 25							✓				3	5	–	6	–	90	RCP / HW	
MAR 26							✓				2	5	–	–	–	90	RCP / HW	
MAR 27																		
MAR 28	→ See Map 12																	
MAR 29	See Map 12																	

Crum Creek (Water shed)

Form O - Outfall Data

Person: [illegible] Date: 7/21/23 Time Since Last Rain was ≥ 72 Hours: Yes 24 hrs

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 24 hrs

Municipality: Marple Township Name of receiving water: Crum Creek

Pipe Name #	Pipe #	Storm Drain? Yes/No/ Not sure	Time (military) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
C-1	CMP	Y		42"	2"	Bankfull	wide	stream	Y	Clean	Residential	0
C-2	CMP	Y		42"	1"	Flash	3.5'	0:1	Y	Clean	Residential	0
C-3	Double CMP	Y		2 - 60"		Bankfull	wide	stream	N	Red Brown (Iron)	houses	1
C-4	CMP	Y		6"		Bankfull	wide	stream	N	Oil sheen	houses	1
C-5	PVC	Y		8"		6"	1'	3:4	N	Brown/Sediment	Residential	0
C-6	RCP	Y		24"		2'	4'	2:1	N	Clean	Residential	0
C-7	RCP	Y		24"		16"	8'	1:1	N	Soil/Leaching/ trash/plastic	Residential	2
C-8	Plastic	Y		24"	1"	Bankfull	wide	Stream	N	Clean	Residential	0
C-9	Double CMP	Y		2 - 12"		Bankfull	wide	stream	N	Iron/Leaching	Single Family	2

Rating System:

0=No observed impairment (No dry weather flow, no scouring, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Crum Creek Watershed

Form O - Outfall Data

Person: [illegible], RVAT Engineers Date: 11/24/03 Time Since Last Rain was ≥ 72 Hours: Yes 24 hrs

Quantity of Last Rain: <0.1 inches; >0.1 inches Days Since Last Rain 24 hrs

Municipality: Middletown Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (00:00; am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Odor/Color (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
C-10	CIP	Y		10"		Narrow	1-2'	Straight	N	Clear (CW)	Park	1
C-11	RCP	Y		36"	4"	6"	6'	1:2	Y	Some Trash	Neighborhood	1
C-12	RCP	Y		24"	3"	6"	4'	1:6	N	Algae/Moss	Neighborhood	2
C-13	Clay	Y		8"	2"	2"	1'	(1	N	Odor; Rusty sediment	No playground	2
C-14	Metal	Y		Under	Backflow	Wide	Shallow	Wet	Y	Clear	Neighborhood	0
C-15	RCP	Y		24"		1"	1'	1:2	N	Brambles, Vegetation	Neighborhood	0
C-16	RCP	Y		8" (Oval)	3"	9"	18"	1:2	Y	Some Trash (Bottles)	Neighborhood	0
C-17	RCP	Y		30"	4"	8"	4'	1:4	N	Debris, Algae	Neighborhood	0
C-18	CMP	Y		30"	3"	2.5'	12"	1:3	Y	Foam/Bacteria	Neighborhood	1

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Minor impairment (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to Vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Crum Creek Watershed

Form O - Outfall Data

Person: Adam McCaughey, A V & B Engineers Date: 7/24/03 Time Since Last Rain was ≥ 72 Hours Yes 24 hrs

Quantity of Last Rain: < 0.1 inches > 0.1 inches Days Since Last Rain 24 hrs.

Municipality: Marple Township Name of receiving water: Crum Creek

Pipe/ Swale #	Photo #	Storm Drain? Yes/No/ unsure	Time (military) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slope* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
C-19	RCP	~		48"	2'	2'	6'	Rock	Y	Clear/Sediment	Residential	1
C-20	RCP	?		12"		1'	3'	2:1	N	Clear/No Odor/No Color	Grass	0
C-21	CMP	Y		36"	4"	6"	4'	3:1	Y	Clear/Plants (Green)	Residential Backyards	1
C-22	?	Y		Covered	4ft ±	Covered	Unknown	3:1	Y	Rainbow Harvest	Residential	2
C-23	CMP	Y		12"	2"	6"	2'	3:1	Y	Rainbow Harvest	Residential	1
C-24	Pipe	Y		36"	3"	2'	4'	5:1	Y	Clear/No Odor/No Color	Residential/Grass	1
C-25	Creek	?			6"	1'-2'	3'	1:1	Y	Sediment/Debris	Residential	1
C-26	CMP	Y		4'	1"	1"	6'	1:1	Y	Rainbow	Residential	1
C-27	RCP	Y		24"			3'	Rock	N	Sediment/Debris	Residential	1

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no discoloration or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in good condition)

2=Impairment - needs investigation (flow - exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*T = Vertical - rectangular channel

NOTES:

C Run Crum Watershed

Form O - Outfall Data

Person: Abby McGregor, EVS Date: 11/5/05 Time Since Last Rain was ≥ 72 Hours: Yes 24 hr.

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain 24 hr.

Municipality: Rapho Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Form (box, pipe)	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
C-25	Creek	?		15"	3"	1'	3'	1:	Y	Clear	Woods	0
C-29	RC Channel	Y				2'	6'	13:1	N	Algae	Woods	1
C-30	Crop	Y		18"	Partially	one	one		N	Clear	Road	0

Rating Systems:

0 = No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

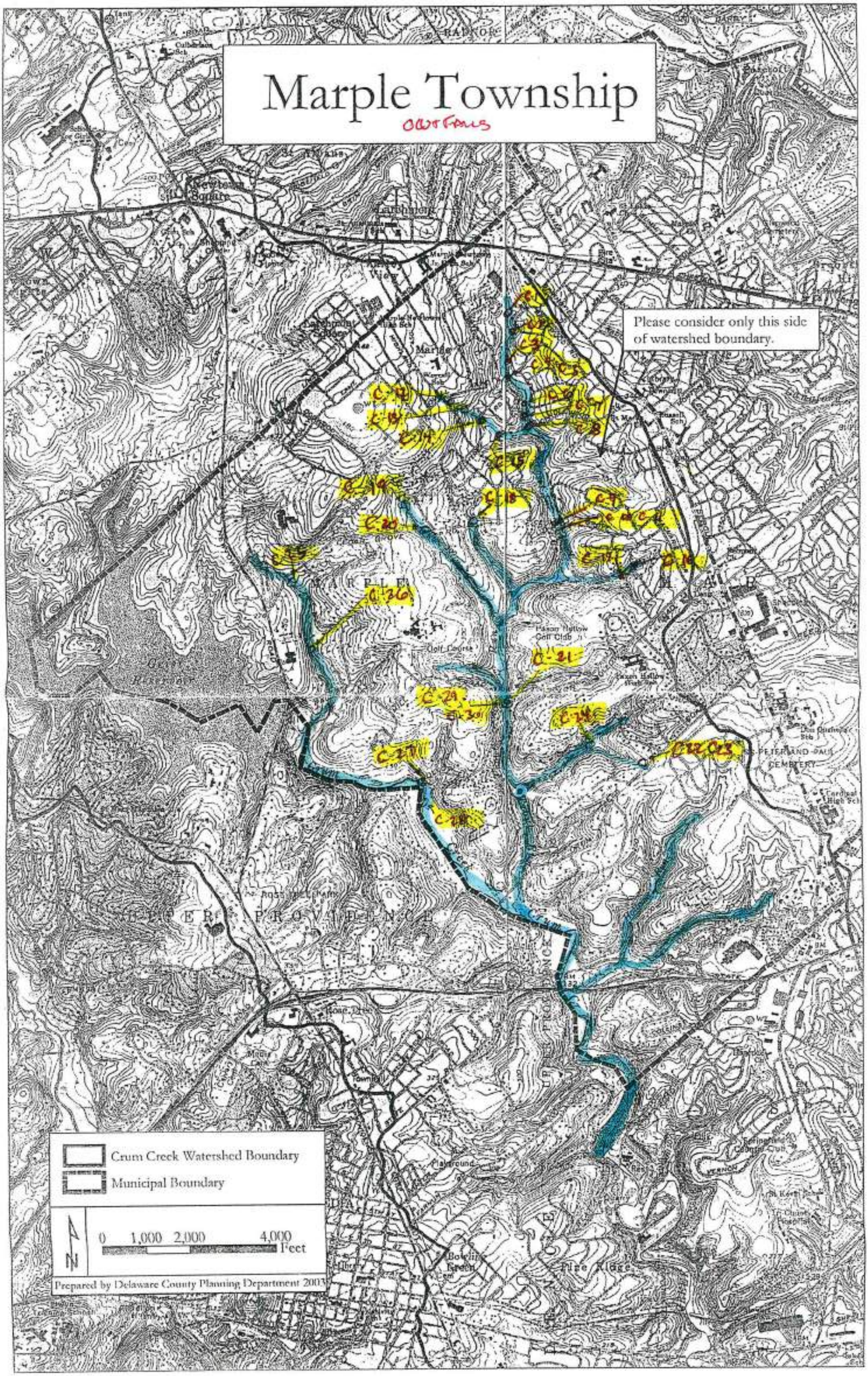
1 = Needs moderate cleaning (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

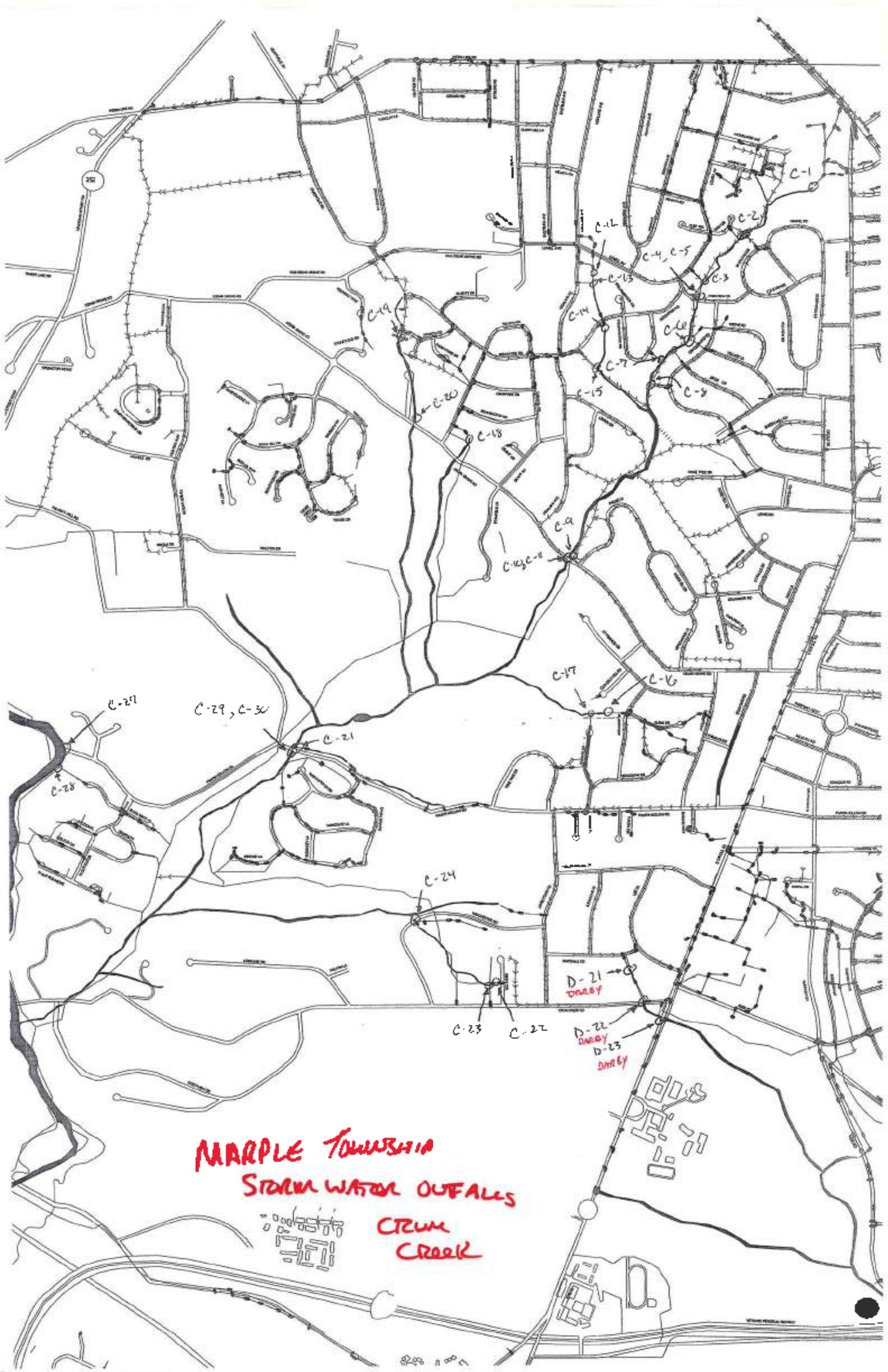
2 = Impairment - needs investigation (Obvious existing odors, foam, solids, turbidity or oil sheen, excessive sediment deposition, algae or debris, pipe collapsed or cracking, blocked catch basin or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - concrete lined channel

NOTES:


Marple Township
OWFalls
Please consider only this side of watershed boundary.
C-36
C-21
C-29
C-30
C-22, C-23
Crum Creek Watershed Boundary
Municipal Boundary
0 1,000 2,000 4,000 Feet
Prepared by Delaware County Planning Department 2003


C-1
C-2
C-3
C-4, C-5
C-6
C-7
C-8
C-9
C-10
C-11
C-12
C-13
C-14
C-15
C-16
C-17
C-18
C-19
C-20
C-21
C-22
C-23
C-24
C-27
C-28
C-29, C-30
D-21
DARBY
D-22
DARBY
D-23
DARBY
MARPLE TOWNSHIP
STORM WATER OUTFALLS
CRUM
CREEK

"Electronic Image" Rendered photograph by William Brokaw, Brokaw Photography

DELAWARE COUNTY PLANNING DEPARTMENT

DCPD

Court House/ Government Center, 201 W. Front St., Media, PA 19063
Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning department@co.delaware.pa.us

TO: Bill Brokaw

FROM: Christopher Gallagher

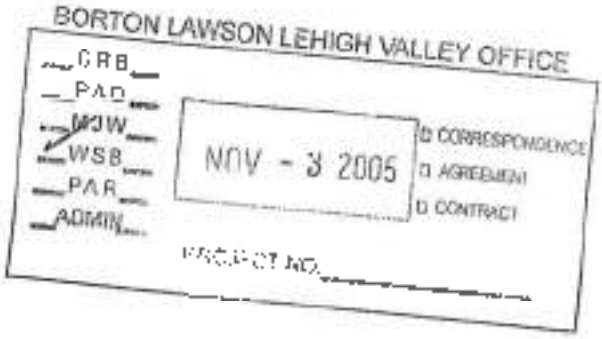
DATE: 11/1/05

RE: Crum Creek Stormwater Management Plan
Marple Township Forms

Bill,

Please find enclosed the completed Marple Township survey, forms, and maps.

If you require and further information, please do not hesitate to contact me at (610)-891-5130.



"Electronic Image" Rendered photograph by William Brokaw, Brokaw Photography

Form O - Outfall Data

Person: [illegible] Date: 7/[illegible]/03 Time Since Last Rain was ≥ 72 Hours: Yes 4+ hrs.

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain 4+ hrs.

Municipality: Hampton Township Name of Receiving water: Deer Creek

Up: Swale Y	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) military	Pipe Diameter (inches)	Depth of Lowest pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if Durables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
O-19	CIP	Y		12"	Dry	n/a	grass		N	Clear	Roadway, woods	0
O-20	CMP/Metal	Y		Buried	Dry	n/a	grass		N	Clear	Residential	0
O-21	Plastic	Y		24"	0"	0"	4'	2:1	Y	Rusty/Reddish	Residential	0
O-22	CMP	Y		Buried	Dry	n/a	grass		Y	Debris	Residential	0
O-23	RCP	Y		Buried	Dry	n/a	grass		Y	Slight Oil	Residential	0

Rating Systems:

0=No observed impairment (No dry weather flow, no solids, limited soil or debris, no erosion or sediment, pipe in good repair)

1=Weak evidence (some dry weather flow, moderate staining or sediment deposition, some flow obstacles or debris, minor damage, pipe in poor condition)

2=Impairment - more investigation (flow exhibiting odors, hues, solids, turbidity or oil sheen, excessive sediment deposition, algae or debris, pipe collapsed or crumbling, flooded catch basin or drain)

H:V = Horizontal to vertical ratio

*(1:1 = Vertical distance to channel)

NOTES:

B.d Brainerd

Location of sample Outfalls:

Unnamed Run, starting at IHS, Anaconda Rd, ending in Darby Creek n of Fawn Hill Rd.

1. IHS has outfalls from parking lot and, apparently, roof.
2. Culvert from IHS contains a second pipe just above, perhaps from intervening ground. Both pipes feed headwaters of Run, beside Creek Church
3. White PVC pipe S bank from parking (of)
3A. 12" pipe encased in concrete, downstream end of 150' channelized extra
4. Approx. 12" drain pipe from Overbrook Dr, at head of tributary.
5. Several hundred feet downstream from tributary is a ~16" diameter pipe, just below 2748 S. Kent Road, causing considerable erosion of S bank
5A. N Bank, ~100' downstream of outfall 5, drains James Road
6. Just below Cherry Hill Rd, on Township property, this big outfall feeds a tributary to unnamed Run.

7. I am told there is an outfall where unnamed Run meets Darby Creek.

8. Big one on SW corner, Darby Creek / Sprout.

Longford Run

1. Run starts in 3 adjacent outfalls below Indian Rd

2. 20' N of New Ardmore Ave, E bank.

3. On S side of N Ave Bridge, on either side of culverts are outfalls.

4. 150' downstream, W bank.

Wheatstone Run

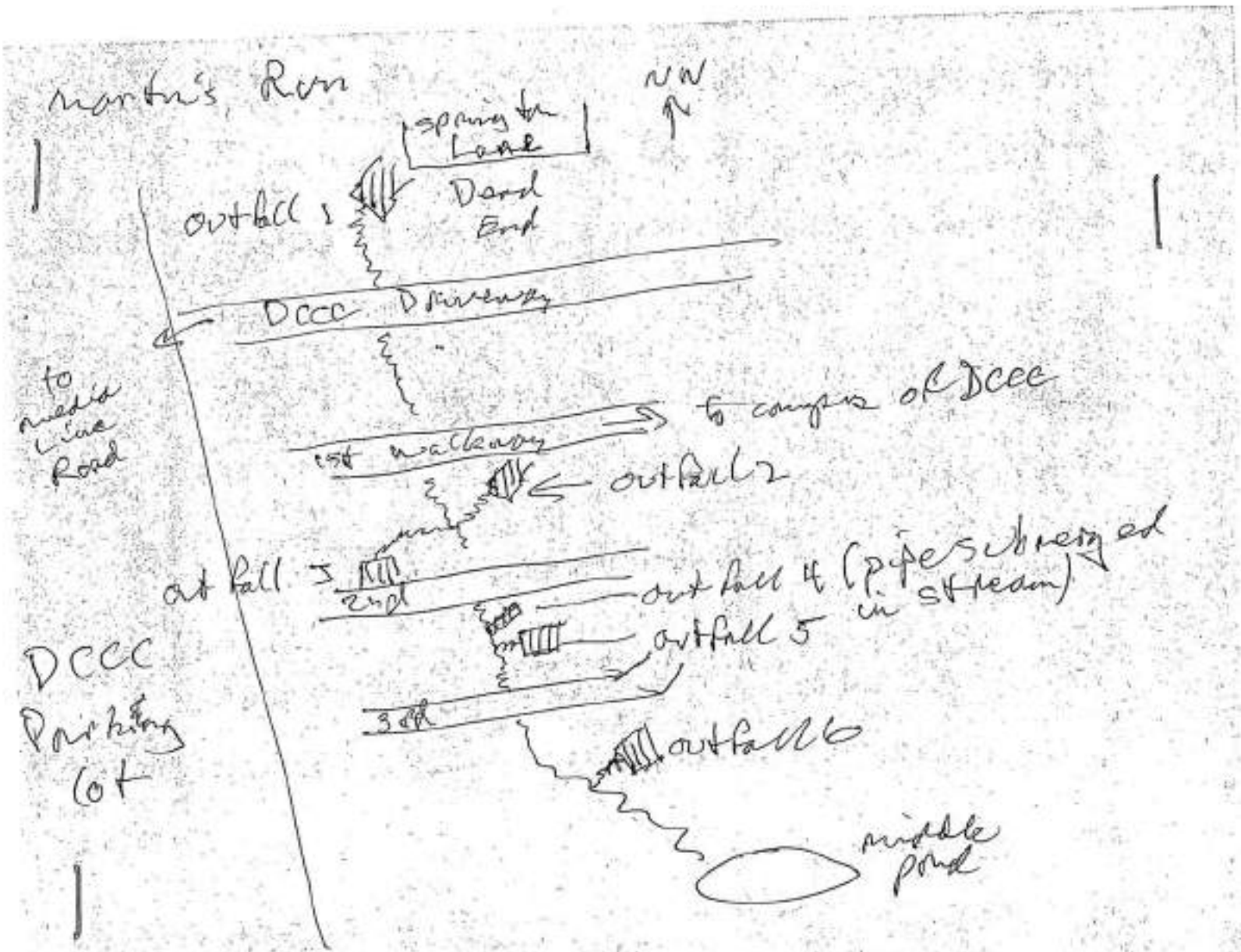
1. Run starts here in Rabbit Run outfall. This short segment before it goes underground at Parkway, was bright orange this spring, possibly from iron oxide. I saw this same problem at Langford weep holes between Sprout and north Ave, and at Langford outfall no. 2, and on Trout Run outfall 4.

2. This pipe may be just a culvert or it may be the outfall for storm drains evident in the parking lots under which it passes.

3. This trib starts in an outfall

S of Read Rd; draining to Mart[4]
Parking Lot

4. At end of Manufacturing Rd, E bank.



outfall 7 is at Michelle drive, on east bank, between Cedar Grove and Palmer's Grand Rds

Trout Run

1. Run ~~starts~~ in this big pipe under Giant / DE Parking lot.

2. About 400' downstream is a small dam next to an E bank pipe that may drain Dam Tower.

3. 150' N of where Parkview Dr. crosses Trout Run, on W bank drains CCAC Terrace.

4. About 500' N of Cedar Grove Rd E bank, 6-8' inland from stream. Note red/orange effluent.

5. 50' N. of Cedar Grove E bank

6. W bank, Paxon Manor GOLF Course.

7. S side, Paxon Manor Rd bridge W bank.

→

8. This pipe was no longer functional. It's on S bank of a tributary, not shown on map, that starts below the middle School. Pipe is 30' downstream from entrance to Golf Course.

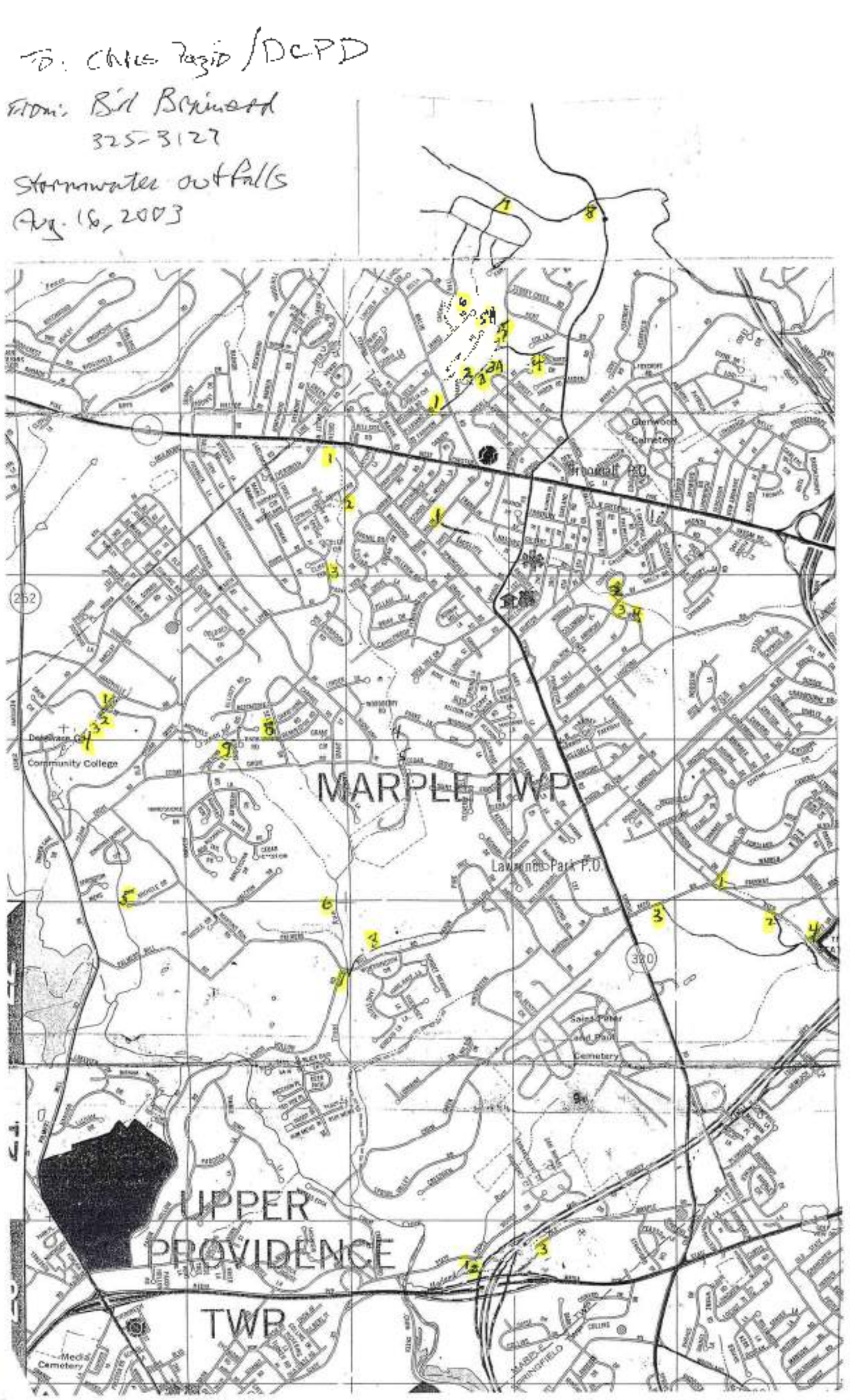
Maitland Run

1. W bank 10' downstream of State Road, and to west of Maple Woods Drive.
2. Follow this trib 150' downstream to where it joins effluent from Blue Route pond, coming out of a big concrete culvert.
3. A hard one to find. At State Rd, a stream enters a culvert (under Blue Route) that leads to a pond. Follow this stream 300' south to its origin in a pipe coming from under Blue Route, near intersection with by pass. Water is remarkably clear.

To: Chris Pazid / DCPD

From: Bill Brainard
325-3127

Stormwater outfalls
Aug. 16, 2003



Remington & Vernick Engineers
Remington, Vernick & Vena Engineers
Remington, Vernick & Beach Engineers
Remington, Vernick & Walberg Engineers

EDWARD VERNICK, P.E., C.M.E., President
CRAIG F. REMINGTON, P.L.S., P.P., Vice President

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Terence Vogt, P.E., P.P., C.M.E.
Dennis R. Yocca, P.E., P.P., C.M.E.

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(856) 795-1882 (fax)

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Burlington City, NJ 08016
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(609) 387-5380 (fax)

Remington, Vernick & Vena Engineers
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(609) 522-5151 (fax)

9870 Highland Street
2nd Level
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(302) 934-8306 (fax)

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Conshohocken, PA 19428
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(610) 940-1131 (fax)

University Office Park
Commonwealth Building
256 Chapman Road, Ste. 104B
Newark, DE 19702
(302) 266-0212
(302) 266-0213 (fax)

www.rve.com

Established in 1901

July 28, 2003

Karen Holm
Delaware County Planning Department
Government Center Building
201 West Front Street
Media, PA 19063-2751

Re: Township of Marple
Act 167 Stormwater Management Plan for the Crum Creek and Darby Creek
Our File # PDMAT350

Dear Ms. Holm:

Enclosed please find one copy of the Crum Creek and Darby Creek outfall maps and outfall data sheets. The maps and sheets were completed as per the directions given at the July 8, 2003 Act 167 conference held at Marple Township. We understand that the County will use this information to develop an ordinance and produce electronic GIS mappings that can be used by the Township for their Year 1 NPDES submission.

Should you have any questions please feel free to contact me directly at (610) 940-1050, extension 515.

Very truly yours,
Remington, Vernick & Beach Engineers

Christopher J. Fazio, P.E., C.M.E.

Cc: Joseph Flicker, Town Manager (w/ enclosure)
Thomas F. Beach, P.E., C.M.E. (w/ enclosure)

S:\Secretary\Marple Correspondence\PDMAT350 July 28, 2003 Act 167.doc

Crum Creek Watershed

Form O - Outfall Data

Person: [illegible] [illegible] Date: [illegible] Time Since Last Rain was >72 Hours Yes 24 hrs.

Quantity of Last Rain: <0.1 inches >0.1 inches Days Since Last Rain 24 hrs.

Municipality: Marple Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No (NA unsure)	Time (24:00) swales	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2,
C-1	CMP	Y		42"	2"	Broadly	wide	>Flat	Y	Clear	Neighborhood	0
C-2	CMP	Y		42"	1"	Flat	3 ½'	1:1	Y	Clear	Neighborhood	0
C-3	Brick CMP	Y		2' - 6"		Broadly	wide	>Flat	No	Soil build up (mild)	houses	1
C-4	CMP	Y		8"		Broadly	wide	>Flat	No	Old pipes	houses	0
C-5	PVC	Y		8"		6"	1'	3:4	No	Algae/Sediment	Neighborhood	1
C-6	RCP	Y		24"		2'	4'	2:1	No	Clear	Neighborhood	0
C-7	RCP	Y		24"		15"	8'	1:3	No	Soil/Grass/Algae	Neighborhood	1
C-8	Plastic	Y		24"	1"	Broadly	wide	>Flat	No	Clear	Neighborhood	0
C-9	Brick CMP	Y		2' - 2"		Broadly	wide	>Flat	No	Trash/Sediment/Algae	Road + Neighborhood	2

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no stains or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate staining of sediment deposition, some floatables or debris, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, stains, suds, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Crow Creek Watershed

Form O - Outfall Data

Person: Abby Mitchell, DVRPC Date: 7/28/16 Time Since Last Rain was ≥ 72 Hours: Yes 24 hrs

Quantity of Last Rain: < 0.1 inches; ≥ 0.1 inches Days Since Last Rain 24 hrs

Municipality: Worcester Township Name of receiving water: Crow Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (00:00) a.m./p.m.	Pipe Diameter (inches)	Depth of Low-flow pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slope* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
C-1	CIP	Y		12"		Overlap	4'	Steep	N	Clear (Odor)	Park	1
C-2	RCP	Y		36"	1"	6"	6'	1:1	Y	Sediment/Trash	Residential	1
C-3	RCP	Y		24"	3"	6"	4'	1:1	Y	Algae/Foam	Residential	2
C-3	Clay	Y		5"	2"	1"	1'	1:1	N	Oily/Rainbow sheen	Residential	2
C-4	ADS/Plas	Y		Unsure	Muddy	Unk	Steep	Unk	Y	Clear	Residential	0
C-5	RCP	Y		24"		1"	1'	1:1	N	Rainbow Sheen	Residential	0
C-6	RCP	Y		5" (Oval)	3"	1"	1.5'	1:1	Y	Foam (Brown)	Residential	2
C-7	RCP	Y		36"	1"	3"	3'	1:1	Y	Oily Sheen	Residential	2
C-8	Conc	Y		36"	3"	2.5"	12'	1:1	Y	Algae/Sediment	Residential	1

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - Needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drains)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Cross Creek Watershed

Form O - Outfall Data

Person: [illegible] B W & S Engineers Date: 7/24/03 Time Since Last Rain was ≥ 72 Hours: Yes 21 hrs

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain: 21 hrs.

Municipality: Peters Township Name of receiving water: Cross Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No/ Not sure	Time (EDST) 24-hr	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color, Odor (specify if floatables, algae or scum are present)	Describe land use of upstream drainage area	Rating (0-3)
C-19	RCP	Y		48"	2"	6'	6'	[illegible]	Y	[illegible]	[illegible]	1
C-20	RCP	Y		12"		1'	3	[illegible]	[illegible]	[illegible]	Stone	[illegible]
C-21	CMP	Y		36"	4"	6"	[illegible]	3:1	Y	[illegible]	[illegible]	[illegible]
C-22	?	Y		[illegible]	[illegible]	[illegible]	[illegible]	3:1	Y	[illegible]	[illegible]	[illegible]
C-23	CMP	Y		12"	6"	6"	2'	3:1	Y	[illegible]	[illegible]	[illegible]
C-24	CMP	Y		36"	5"	2'	15	[illegible]	Y	[illegible]	[illegible]	[illegible]
C-25	corrug.	Y			6"	1'-2'	3'	[illegible]	Y	[illegible]	[illegible]	[illegible]
C-26	CMP	Y		48"	1"	6"	[illegible]	[illegible]	Y	[illegible]	[illegible]	[illegible]
C-27	RCP	Y		24"			3'	Flat	N	Sediment [illegible]	[illegible]	[illegible]

Rating System:

0=No observed impairment (flowing over dry weather flow, no solids, floatables or debris, no erosion or sedimentation, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition,

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or inlets)

H/V = Horizontal to vertical ratio

*H:V = Vertical : rectangular channel

NOTES:

C River Crest Watersheds

Form O - Outfall Data

Person: Olivia McGuinness, RVIB Date: 7/26/05 Time Since Last Rain was ≥ 72 Hours: Yes 24 hrs

Quantity of Last Rain: < 0.1 inches; ≥ 0.1 inches Days Since Last Rain 24 hrs.

Municipality: Rapid Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (GMT-05:00) hh:mm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-4)
C-28	Creek	?		15"	3"	1'	7'	1:1	Y	Clear	Woods	0
C-29	RC Culvert	Y				2'	9'	Box	N	Algae	Woods	1
C-30	CMP	Y		18"	Overflowing	1ft	Creek		N	Clear	Road	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no discolor or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow, noticeable odors, stains, solids, trash, dry weather sheen, considerable soil erosion, deposition, algae or debris, pipe collapsed or crumbling, blocked catch basin or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: [illegible] Date: [illegible] Time Since Last Rain was ≥ 72 Hours: Yes [illegible] No

Quantity of Last Rain: < 0.1 inches / > 0.1 inches Time Since Last Rain: [illegible]

Municipality: [illegible] Name of receiving water: [illegible]

Pipe Scale #	Photo #	Material (Concrete, Metal, Plastic, Vitrified Clay, Other)	Shape (Circular, Elliptical, Box, Other)	Pipe Diameter (inches)	Height of Invert from Pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slope (H:V)	Flow Observed (Yes or No)	Water Color/Odor (presence of Bacteria, Algae, Sediment, grease)	Downstream Evidence of Upstream Discharge	Rating (0-5)
D-1	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1
D-3	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	
D-4	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0
D-5	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	
D-6	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D-6a	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D-7	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D-8	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D-9	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Rating Systems:

0=No observed impairment (No dry weather flow, no visible flow evidence, no sediment deposition, no stains, no excessive algae, no pipe damage, pipe is free flowing)

1=Evidence of minor impairment (Intermittent flow, may exhibit some of sediment deposition, some flow evidence, some algae, pipe damage, pipe is free flowing)

2=Moderate impairment (Intermittent flow, may exhibit some of sediment deposition, some flow evidence, some algae, pipe damage, pipe is free flowing)

3=Severe impairment (Flow exhibits signs of pollution, heavy sediment deposition, obvious flow evidence, obvious algae, pipe damage, pipe is clogged or crumbling)

4=Severe impairment (Flow exhibits signs of pollution, heavy sediment deposition, obvious flow evidence, obvious algae, pipe damage, pipe is clogged or crumbling)

5=Severe impairment (Flow exhibits signs of pollution, heavy sediment deposition, obvious flow evidence, obvious algae, pipe damage, pipe is clogged or crumbling)

(Use worst case observations or above)

H/V = Horizontal to vertical ratio

V=1 = Vertical (no angle, straight)

NOTES:

Form O - Outfall Data

Person: _____ Date: 7/23/08 Time Since Last Rain was ≥ 72 Hours: Yes _____

Quantity of Last Rain: < 0.1 inches; >0.5 inches Days Since Last Rain _____

Municipality: _____ Name of receiving water: _____

Pipe Swale #	Outfall #	Storm Drain? Yes/No (Not sure	Time (2400) military	Type Structure (Shape)	Depth of Pool in pipe (feet)	Color of Deposit	Color of Odor Present Width (feet)	Channel Sub-Region* (1,2,3)	Flow Observed (Yes or no)	Water Color/Odor (specify if Blue Dye, algae, Sediment present)	Describe evidence of past non-stormwater use	Rating (0-2)
D-1	D-1	Y		Culvert	Dry	Light	Yellow		N	Clear	Flow from Culvert	1
D-2	D-2	Y		Culvert	6"	Dk Brown	Yellow	Channel	N	Clear Odor	Flow from Culvert	1
D-3	D-3	Y		Culvert	Dry	Light	Yellow		N	Clear, slight Sediment	Yellow Flow	1
D-4	D-4	Y		Culvert	Dry	Light	Yellow		N	Clear	Yellow Flow	1
D-5	D-5	Y		Culvert	Dry	Light	Yellow		N	Clear	Yellow Flow	1
D-6	D-6	Y		Culvert	6"	Dk Brown	Yellow	Channel	N	Clear, Sediment	Yellow Flow	2
D-7	D-7	Y		Culvert	3"	Light	Yellow	Channel	N	Clear	Yellow Flow	1
D-8	D-8	Y		Culvert	6"	Dk Brown	Yellow	Channel	N	Clear, Sediment	Yellow Flow	2
D-9	D-9	Y		Culvert	3"	Light	Yellow	Channel	N	Clear	Yellow Flow	1

Rating System:

0=No discernible impairment (Normal flow, no solids, Low odors, no discoloration, no oil sheen, no algae growth)

1=Slight impairment (Some dry weather flow, moderate staining or discoloration, some Low odors or debris or algae, plant growth)

2=Significant impairment (Severe staining, heavy solids, Oil sheen, excessive algae growth, strong odors, excessive debris or algae, no plant growth)

(Most of each is based on Rain)

H/V = Horizontal or vertical weir

T = Vertical rectangular channel

NOTES:

Remington & Vernick Engineers
Remington, Vernick & Vena Engineers
Remington, Vernick & Beach Engineers
Remington, Vernick & Walberg Engineers

EDWARD VERNICK, P.E., C.M.E., President
CRAIG F. REMINGTON, P.L.S., P.P., Vice President

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Edward J. Walberg, P.E., P.P., C.M.E.
Thomas F. Beach, P.E., C.M.E.

DIRECTOR OF OPERATIONS
CORPORATE SECRETARY
Bradley A. McLaughlin, B.A., M.P.A.

SENIOR ASSOCIATES
John J. Cantwell, P.E., P.P., C.M.E.
Alan DiMatteo, P.E., P.P., C.M.E.
Frank J. Seney, Jr., P.E., P.P., C.M.E.
Terence Vogt, P.E., P.P., C.M.E.
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232 Kings Highway East
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(856) 795-9595
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(609) 645-7076 (fax)

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(302) 266-0212
(302) 266-8208 (fax)

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Established in 1901

June 10, 2005

Delaware County Planning Department
Government Center Building
201 West Front Street
Media, PA 19063

Attn: Karen Holm

Re: Marple Township
Crum Creek Watershed Planning
Our File# PDMAT387

Dear Karen:

Attached, please find one (1) copy of the information you requested for the Crum Creek Watershed Planning Report.

Should you need any further assistance on this matter please feel free to contact our office at (610) 940-1050.

Very truly yours,
Remington, Vernick & Beach Engineers

Christopher J. Fazio, P.E., C.M.E.

Enclosures
cc: Joseph Wm. Flicker, Township Manager
Thomas F. Beach, Executive Vice President
Chris Serpente, P.E.

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: MARPLE TOWNSHIP

Contact Person: JOE FLICKER

WPAC Designee: JOE FLICKER

Title: TOWNSHIP MANAGER

Address: 227 SOUTH SPROUL RD

BROOMALL PA 19008

Phone: 610.356.4040

Fax: 610.356.3587

Person Completing form (if different from Contact Person).

Name: C. SERPENTE

Address: REMINGTON, VERNICK + BEACH ENGINEERS

922 FAYETTE ST

Phone: CONSHOHOCKEN, PA 19428

Fax: 610.940.1050 x519, FAX: 610.940.1161

E-mail: X

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	X	
Subdivision/Land Development Ordinance	X	
Separate Stormwater Ordinance	X	
Separate Floodplain Ordinance	X	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors		X		X
Municipal Engineering Department				
Municipal Planning Department	X			
County Planning Department	X			
County Conservation District	X			
Zoning Hearing Board	X		X	
Consulting Engineer	X		X	
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

COMING VIA MAIL, PLS CALL CHRIS SERPENTE, 610.940.1050 X519 IF NEEDED.

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	X		
Comprehensive Land Use Plan		X	PLANNED REVISION
Existing Land Use Maps		X	PLANNED REVISION
Proposed Land Use Maps			
Zoning Maps		X	EXPECT 6/05

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	
Participates in FEMA Emergency Program	Y
Participates in FEMA Regular Program	

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality

What we would like to ask of you is that you complete as much of the attached data collection forms as possible There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

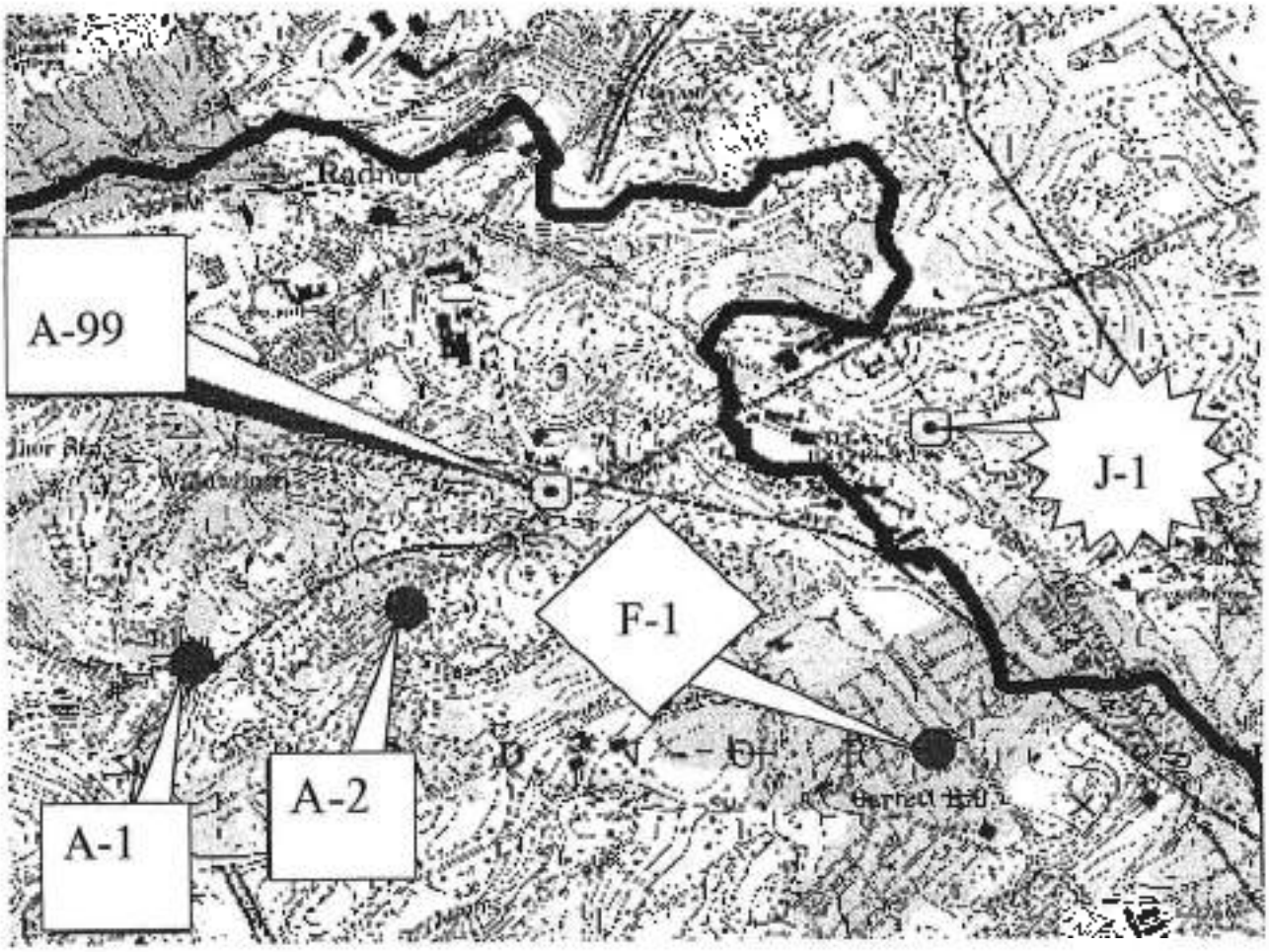
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help

Sample Location of Information from Data Collection Forms on the Municipal Map



Form A

STORM WATER PROBLEM AREAS FORM A. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	Before Filling Out Form, See Instructions On Back.
Name:	CRUM/DARBY	Name:	C. SERRENTE
Municipality:	MARPLE	Telephone:	610 940 1050
County:	DELAWARE	Date:	6/6/05

MAP NO. *	A-1	A-2	A-3	A-4	A-5	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems												
Flooding	X	X			X							
Accelerated Erosion NO												
Sedimentation NO												
Landslide NO												
Groundwater			X	X								
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)												
Cause (s)												
Storm Water Volume	X	X	X	X	X							
Storm Water Velocity												
Storm Water Direction												
Water Obstruction												
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	05	05	05	05	05							
Year Hrs; Known Occurred												
Regularity												
More Than 1 Year	Y	Y	Y	Y	Y							
Less Than 1 Year												
Only During Agnes												
Duration (If Applicable)												
Less Than 1 Day	Y		Y									
1 Day + (Enter Days)		≈3			≈2							
Property Damage												
Loss of Life/Vital Services	X											
Private	X	X										
More Than One Owner												
Types of Properties												
Number of Properties												
Public (List Types)												
Explanation Line No. (On Back)												
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed												
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities.

A-1: BRIDGE OUT. APARTMENT DAMAGE.

A-2: HOUSE DAMAGE

A-5: FLOODING ON WATER COMPANY PROPERTY

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)". Example: 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes

Use the explanation lines to list the types of public property damages (e.g. roadways, hospitals, etc.)

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities



Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, wall, wingwall, fill, pier, wharf, embankment, pavement, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C SHEET ____ OF ____

WATERSHED
Name: CRUM/DARBY
Municipality: MARPLE
County: DELAWARE

FORM COMPLETED BY
Name: C. SERPENTE
Telephone: 610.940.1050
Date: 6/7/05

TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening; Channel Realignment; Rock Riprap; Levee; Gabions; Pipe Channel; Dams; Floodwall; Concrete Lining

For County Use:

Map ID No	Type of Flood Control Project	Year Constr Built	Expected Life Yrs	Design Flood Frequency Yrs.	Design Flood Discharge C F S (if known)	Owner Name Address and Phone
C-1	1000 FOOT LONG ROCK + WIRE MESH SWALE	2003	25			LAWRENCE COURT APARTMENTS
C-2	RECONSTRUCTED MANHOLE. INSTALLED BLACKTOP BERM IN DRIVEWAY	2005	25			ALLISON DRV.
C-3	ADDED FRENCH DRAINS. RECONSTRUCTED MANHOLE	2005	25			GLENSPRING CIRCLE
C-4	ADDED 5 STORM SEWERS INLETS	2005	25			LANGFORD ROAD
C-						

C-1 => FLOODING STILL A PROBLEM

C-2, C-3 => IMPROVEMENT IN FLOODING

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET OF

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS
Name: CRUM/DARBY Municipality: MARPLE County: DELAWARE	Name: C. SERPENTI Telephone: 610.940.1050 Date: 6/7/05	Channel Excavation / Widening; Channel Realignment; Rock Riprap; Levee; Gabions; Pipe Channel; Dams; Floodwall; Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun: YES – Prelim.	Study Phase Begun: YES – Final	Study Phase Begun: NO	Year Constr. Planned	Projected Complin. Date	Expected Life Yrs.	Design Flood: Frequency Yrs.	Design Flood: Discharge C.F.S.	Map ID No. Form A*	Owner Name, Address, and Phone
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E SHEET OF

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: CRUM/DARBY Municipality: MARPLE County: DELAWARE	Name: C SERPENTI Telephone: 610.940.1050 Date: 6/8/05	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E- 1	RETENTION BASIN	2004	PRIVATELY OWNED	NOT OWNED BY TOWNSHIP
E- 2	SWAMP/ WETLAND	X	Y	NATURAL SWAMP AREA
E- 3	RETENTION BASIN	1993	MARPLE TOWNSHIP	
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

STORMWATER FACILITIES

PROPOSED ~~FLOOD~~ CONTROL ~~PROJECT~~ FORM F SHEET OF

WATERSHED

Name: CREEK/MARSH
Municipality: MARPLE
County: DELAWARE

FORM COMPLETED BY

Name: C SERFONTE
Telephone:
Date

DEFINITION

Storm Water Control Facility
A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates Start	End	Map No. From A*	Contact Person Name, Address and Phone	Comments
F- 1	5 ADDITIONAL STORM SEWERS/INLETS	2005	2005		MARPLE TWP - MHP	MARPLE GARDENS
F- 2	5 ADDITIONAL SEWERS/INLETS	2005	2005		" "	LANGFORD ROAD
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No. if the proposed project will solve or reduce any / all of an identified drainage problem

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin
Natural Pond or Wetland
Parking Lot Ponding
Roof-Top Storage
Semi-Pervious Paving
Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (From)

→ SEE ENCLOSED MAP OF SYSTEM

Township Collection

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET ____ OF ____

WATERSHED

FORM COMPLETED BY

Name:

Municipality: MARPLE

County:

Name:

Telephone:

Date:

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

FORM H (Front)

Storm Water Collection

PROPOSED FLOOD CONTROL PROJECT FORM H. SHEET 1 OF 1

WATERSHED:
Name: CANTWELL
Municipality: MAPLE
County: DELAWARE

FORM COMPLETED BY
Name: D. SERPENTE
Telephone: 610.940.1050
Date: 6/9/05

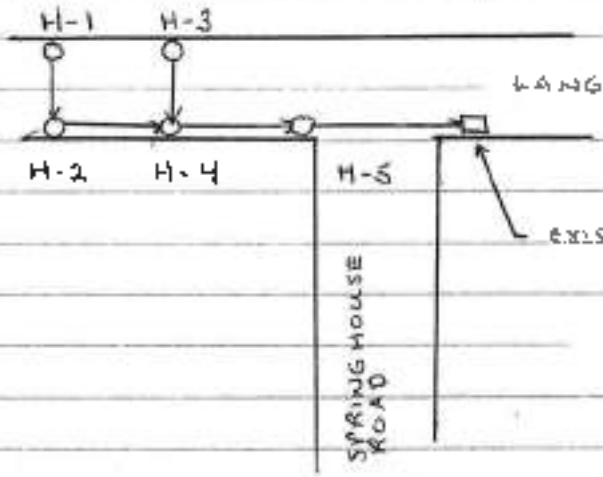
INSTRUCTIONS

Map I.D. No.		System's Elements (x)			Measurements *				Material	Map I.D. Nos. **	Proposed Const. Dates		Design Contact Person		Name of Final Ownership and Maintenance Responsibility	
					Pipe	Open Channel / Swale							Date	Name and		
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		From A	Start	End	Avail.	Phone		
H-1	H-5	X			18"Ø				SOLID ADS		2005	2005			MAPLE TOWNSHIP	SEE E-2
H-25	H-28	X			12"Ø				SOLID ADS		2005	2005			MAPLE TOWNSHIP	SEE E-1
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															

* See measurement key on reverse side ** Enter the storm water problem areas Map I.D. Nos. if proposed project will solve or reduce any / all of the drainage problems

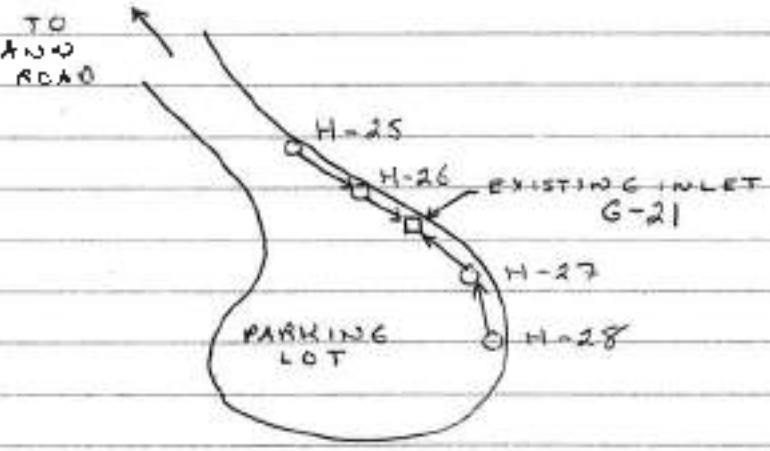
FORM H DATA

H-1 ⇒ H-5



SEE MAP .. F:2..

H-25 ⇒ H-28 MARPLE GARDEN PARK



FORM I

NA

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET OF

WATERSHED

Name:

Municipality: MARPLE

County:

FORM COMPLETED BY

Name:

Telephone:

Date:

DEFINITION

FLOOD HAZARD AREA:

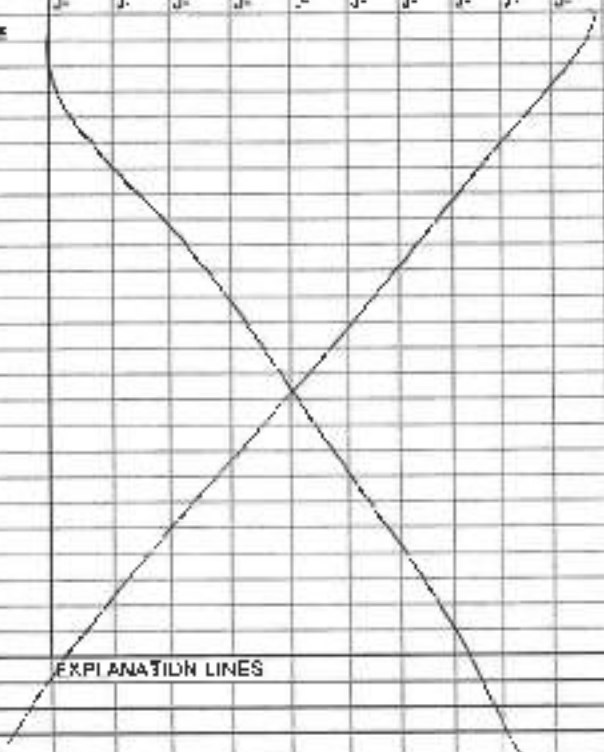
A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD.

For County Use:

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				

Form J

		WATER QUALITY PROBLEM AREAS FORM J. SHEET ____ OF ____											
WATERSHED					FORM COMPLETED BY								
Name:					Name:								
Municipality:	MARPLE				Telephone:								
County:					Date:								
SITE		J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems													
High Community Intolerance													
High Temperature													
High Turbidity													
Refuse/Litter Pollution													
Low Community Diversity													
Low Dissolved Oxygen													
Low pH													
Nutrient Enrichment													
Poor Habitat													
Other/Explanation Line No.													
Potential Cause(s)													
Agriculture													
Construction Site													
Erosion													
Lake Drawdown													
STP Outfall													
Other/Explanation Line No.													
Frequency													
Year Most Recent Occurrence													
Year First Known Occurrence													
Source of Information													
County Water Quality Study													
Severity													
Other/Explanation Line No.													
		EXPLANATION LINES											
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													



Form O - Outfall Data

Person: _____ Date: _____ Time Since Last Rain was ≥ 72 Hrs

Quantity of Last Rain: ≥ 0.1 inches, ≥ 0.1 inches Day

Municipality: EXAMPLE Name of receiving water: _____

Pipe Style #	Photo #	Storm Drain Visible Flow	Time (Hr:Min)	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)

Rating System:

0=No observed impairment (No dry weather flow, no solids, no stains or odors, no sediment, pipe in good repair)

1= Some minor impairment (Some dry weather flow, moderate staining or sediment deposits, some floatables or debris, odor, algae, pipe in poor r

2= Significant impacts (Large dry weather flow, extensive staining, obvious trash, solids, or debris, strong odors, noticeable sediment deposits, algae, or de

HP = Horizontal Pipe (at outfall)

VP = Vertical Pipe (at outfall)

HC = Horizontal Concrete channel

VC = Vertical Concrete channel

NOTES:

Remington & Vernick Engineers
Remington, Vernick & Vena Engineers
Remington, Vernick & Beach Engineers
Remington, Vernick & Walberg Engineers

EDWARD VERNICK, P.E., C.M.E., President
CRAIG F. REMINGTON, P.L.S., P.E., Vice President

EXECUTIVE VICE PRESIDENTS
Michael D. Vena, P.E., P.P., C.M.E.
Edward J. Walberg, P.E., P.P., C.M.E.
Thomas F. Beach, P.E., C.M.E.

DIRECTOR OF OPERATIONS
CORPORATE SECRETARY
Bradley A. Dubeuf, B.A., M.P.A.

SENIOR ASSOCIATES
John J. Canbek, P.E., P.P., C.M.E.
Alan DiBerardinis, P.E., P.P., C.M.E.
Frank J. Seppi, Jr., P.E., P.P., C.M.E.
Terence Vogt, P.E., P.P., C.M.E.
Carmine R. Yoder, P.E., P.P., C.M.E.

Remington & Vernick Engineers
732 King Highway East
Haddonfield, NJ 08033
(856) 795-2095
(856) 795-1882 (fax)

15 East Broad Street
Bridgeton City, NJ 08010
(609) 467-7350
(609) 393-5175 (fax)

Remington, Vernick & Vena Engineers
5 Allen Street
Vena Plaza, NJ 08753
(732) 255-2220
(732) 505-9416 (fax)

Remington, Vernick & Walberg Engineers
845 North Main Street
Pleasantville, NJ 08232
(609) 645-7110
(609) 645-7026 (fax)

6007 New Jersey Avenue
Wildwood City, NJ 08270
(609) 522-5150
(609) 522-0814 (fax)

Remington, Vernick & Beach Engineers
927 Eighth Street
Greenhorn, PA 19403
(610) 940-1050
(610) 940-1161 (fax)

University Office Plaza
Commonwealth Building
200 Chapman Road Ste 104F
Newark, DE 19702
(302) 266-0212
(302) 266-6205 (fax)

www.rve.com

Established in 1901

June 10, 2005

Delaware County Planning Department
Government Center Building
201 West Front Street
Media, PA 19063

Attn: Karen Holm

Re: Marple Township
Crum Creek Watershed Planning
Our File# PDMAT387

Dear Karen:

Attached, please find one (1) copy of the information you requested for the Crum Creek Watershed Planning Report.

Should you need any further assistance on this matter please feel free to contact our office at (610) 940-1050.

Very truly yours,
Remington, Vernick & Beach Engineers

Christopher J. Fazio, P.E., C.M.E

Enclosures
cc: Joseph Wm. Flicker, Township Manager
Thomas F. Beach, Executive Vice President
Chris Serpente, P.E.

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us

PART 1 - GENERAL INFORMATION

Municipality: MARPLE TOWNSHIP

Contact Person: JOE FLICKER

WPAC Designee: JOE FLICKER

Title: TOWNSHIP MANAGER

Address: 227 SOUTH SPROUL RD
BROOMALL PA 19008

Phone: 610.356.4040

Fax: 610.356.3587

Person Completing form (if different from Contact Person):

Name: C. SERPENTE

Address: REMINGTON, VERNICK + BEACH ENGINEERS
922 FAYETTE ST
CONSHOHOCKEN, PA 19428

Phone: 610.940.1050 x519, FAX: 610.940.1161

Fax:

E-mail: X

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	X	
Subdivision/Land Development Ordinance	X	
Separate Stormwater Ordinance	X	
Separate Floodplain Ordinance	X	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors		X		X
Municipal Engineering Department				
Municipal Planning Department	X			
County Planning Department	X			
County Conservation District	X			
Zoning Hearing Board	X		X	
Consulting Engineer	X		X	
Others (List Below				

C. Please provide **copies** of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

COMING VIA MAIL. PLS CALL CHRIS SERPENTE 610.940.1050 X519 IF NEEDED.

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	X		
Comprehensive Land Use Plan		X	PLANNED REVISION
Existing Land Use Maps		X	PLANNED REVISION
Proposed Land Use Maps			
Zoning Maps		X	EXPECT 6/05

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	
Participates in FEMA Emergency Program	Y
Participates in FEMA Regular Program	

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

Place the location of the problem area on the map as shown in the attached example map.

- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area
- Repeat with the next problem area (A-2) and so on

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C 1
  Repeat for all forms

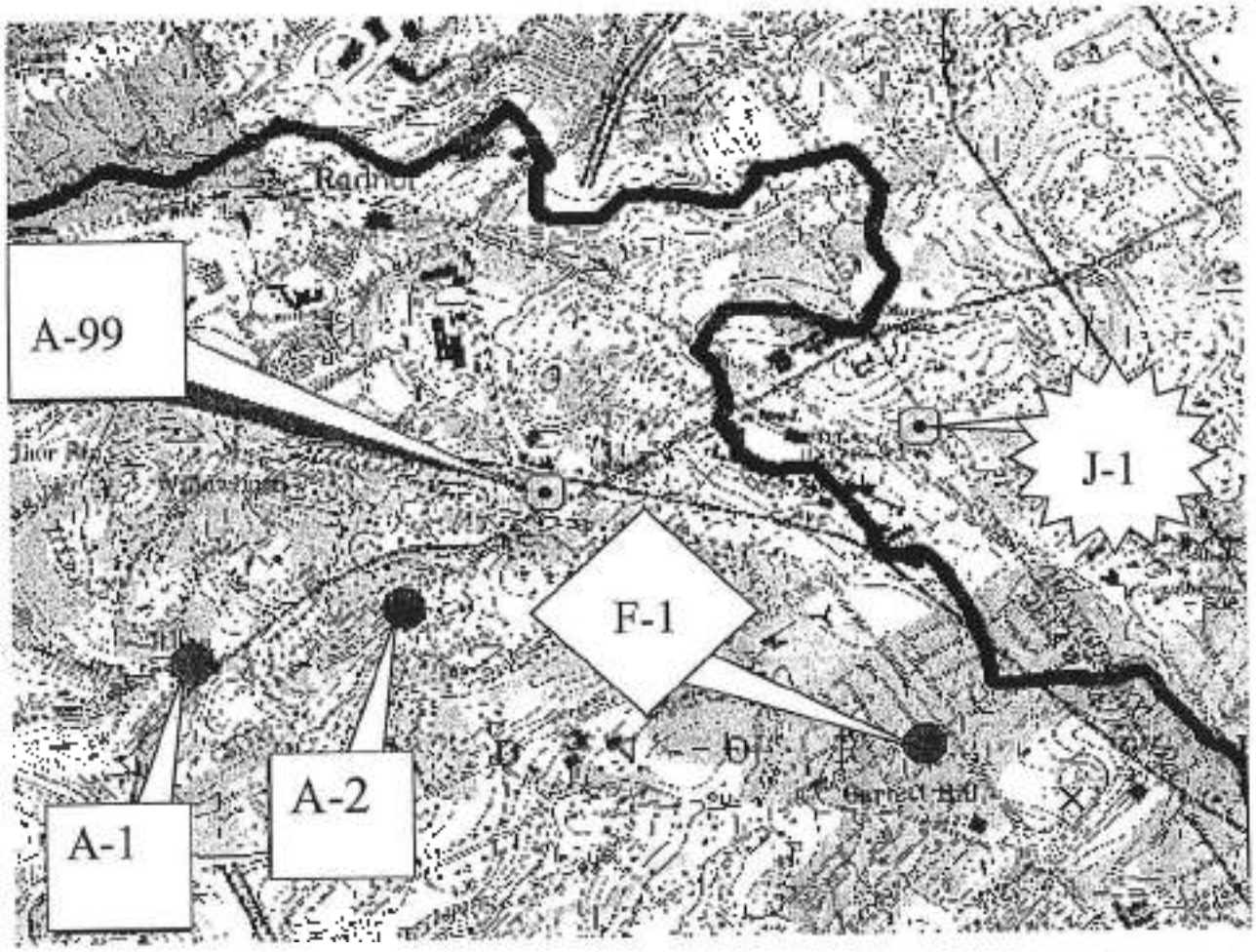
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



Form A

STORM WATER PROBLEM AREAS FORM A. SHEET 1 OF 1

WATERSHED	
Name:	CRUM/DARBY
Municipality:	MARPLE
County:	DELAWARE

FORM COMPLETED BY

Name:	C. SERVENTE
Telephone:	610 940 1050
Date:	6/6/05

Before Filling Out Form, See Instructions On Back

For County Use:

MAP NO. *	A- 1	A- 2	A- 3	A- 4	A- 5	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems												
Flooding	X	X			X							
Accelerated Erosion	NO											
Sedimentation	NO											
Landslide	NO											
Groundwater			X	X								
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)												
Cause (s)												
Storm Water Volume	X	X	X	X	X							
Storm Water Velocity												
Storm Water Direction												
Water Obstruction												
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	05	05	05	05	05							
Year First Known Occurred												
Regularity												
More Than 1 Year	Y	Y	Y	Y	Y							
Less Than 1 Year												
Only During Agnes												
Duration (If Applicable)												
Less Than 1 Day	Y		Y									
1 Day + (Enter Days)		≈3			≈2							
Property Damage												
Loss of Life/Vital Services	X											
Private	X	X										
More Than One Owner												
Types of Properties												
Number of Properties												
Public (List Types)												
Explanation Line No. (On Back)												
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed												
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities.

A-1: BRIDGE OUT. APARTMENT DAMAGE.

A-2: HOUSE DAMAGE

A-5: FLOODING ON WATER COMPANY PROPERTY

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line Nr (s)". Example 1, 2-A, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.



Use the explanation lines to list the types of public property damages (e.g. roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities

Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, concentrated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited as stream bottoms.

Water Obstruction
Any dike, bridge culvert, wall, wingwall fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any water course, floodway, or body of water.

EXPLANATION LINES (continued)

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET OF

WATERSHED
Name: CRUM/DARBY
Municipality: MARPLE
County: DELAWARE

FORM COMPLETED BY
Name: C. SERPENTE
Telephone: 610.940.1050
Date: 6/7/05

TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening — Levee — Dams
Channel Realignment — Gabions — Floodwall
Rock Riprap — Box Channel — Concrete Lining

For County Use

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs	Design Flood Frequency Yrs	Design Flood Discharge C.F.S. (if known)	Owner Name Address, and Phone
C-1	1000 FOOT LONG ROCK + WIRE MESH SWALE	2003	25			LAWRENCE COURT APARTMENTS
C-2	RECONSTRUCTED MANHOLE. INSTALLED BLACKTOP BERM IN DRIVEWAY	2005	25			ALLISON DRV.
C-3	ADDED FRENCH DRAINS. RECONSTRUCTED MANHOLE	2005	25			GLENSPRING CIRCLE
C-4	ADDED 5 STORM SEWERS INLETS	2005	25			LANGFORD ROAD
C-						

C-1 => FLOODING STILL A PROBLEM

C-2, C-3 => IMPROVEMENT IN FLOODING

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET OF

WATERSHED

Name: CRUM/DARBY
Municipality: MARPLE
County: DELAWARE

FORM COMPLETED BY

Name: C. SERPENTI
Telephone: 610.940.1050
Date: 6/7/05

TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening
Channel Realignment
Rock Riprap
Levee
Gabions
Pipe Channel
Dams
Floodwall
Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complitn. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any part of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E SHEET OF

WATERSHED
Name: CRUM/DARBY
Municipality: MARPLE
County: DELAWARE

FORM COMPLETED BY
Name: C SERPENTE
Telephone: 610.940.1050
Date 6/8/05

DEFINITION
Storm Water Control Facility
A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E- 1	RETENTION BASIN	2004	PRIVATELY OWNED	NOT OWNED BY TOWNSHIP
E- 2	SWAMP/ WETLAND	X	Y	NATURAL SWAMP AREA
E- 3	RETENTION BASIN	1993	MARPLE TOWNSHIP	
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

STORMWATER FACILITIES

PROPOSED RUNOFF CONTROL PROJECT FORM F. SHEET ____ OF ____

WATERSHED		FORM COMPLETED BY		DEFINITION
				Storm Water Control Facility
Name:	CRUM / NASH	Name	C. SHEPHERD	A natural / man-made device or structure specifically designed and / or
Municipality	MARPLE	Telephone		utilized to reduce the rate and / or volume of storm water runoff
County:	DELAWARE	Date		from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates		Map No.	Contact Person		Comments
		Start	End	Form A*	Name, Address and Phone		
F- 1	5 ADDITIONAL STORM SEWERS/INLETS	2005	2005		MARPLE TOWNSHIP		MARPLE GARDENS
F- 2	5 ADDITIONAL SEWERS/INLETS	2005	2005		"	"	LANGFORD ROAD
F-							
F-							
F-							
F-							
F-							
F-							

* Enter the storm water problem area's Map ID No., if the proposed project will relieve or reduce any / all of an identified drainage problem

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin	Roof Top Storage
Natural Pond or Wetland	Semi-Pervious Paving
Parking Lot Ponding	Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (Front)

→ SEE ENCLOSED MAP OF SYSTEM

Stormwater Solutions

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET ____ OF ____

WATERSHED

FORM COMPLETED BY

Name:

Municipality: MARPLE

County:

Name:

Telephone:

Date:

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a seperate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

FORM H (Front)

Storm Water Collection

PROPOSED FLOOD CONTROL PROJECT FORM H. SHEET 1 OF 1

WATERSHED

Name: CRYSTAL CREEK
Municipality: MAPLE
County: DELAWARE

FORM COMPLETED BY

Name: C. SERPLUTE
Telephone: 610 940 1050
Date: 6/9/05

INSTRUCTIONS

On the map, locate proposed storm water collection system. Name each proposed system. Indicate a map point to show changes in system elevations, pipe size, pipe direction and connections.

For each system, list proposed pipe and channel segments, beginning with the most upstream segment. Use each map point to identify segments. Complete a separate line for each segment.

For each system, list any structures, such as inlets, manholes, etc., that will be part of the system. Complete a separate line for each structure.

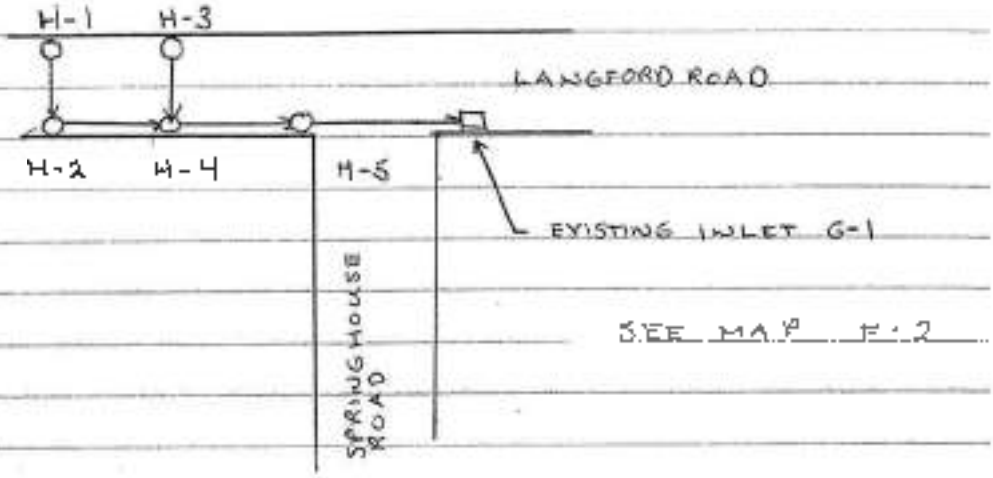
Use lines to link Structures listed on this form with those on the map. Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system form and map. See Sample Diagram and Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Map I.D. Nos.**	Proposed Const. Dates		Design Data	Contact Person	Name of Legal Ownership and	
					Pipe	Open Channel / Swale										
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		From A	Start	End	Size	Name and Phone	Maintenance Responsibility	
1	H-5	X			18"ø				SOLID ADS		2005	2005			MAPLE TOWNSHIP	SEE F-2
H-25	H-28	X			12"ø				SOLID ADS		2005	2005			MAPLE TOWNSHIP	SEE F-1
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															
H-	H-															

* See measurement key on reverse side. ** Enter the storm water problem areas' Map I.D. Nos. if proposed project will solve or reduce any / all of the drainage problems

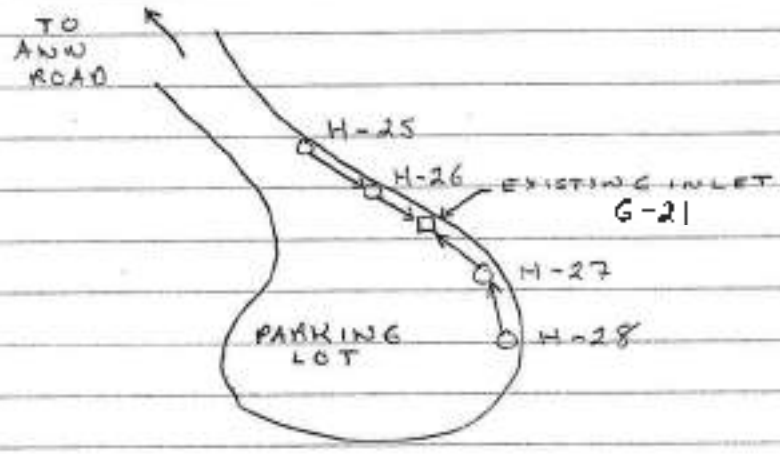
FORM H. DATA

H-1 ⇒ H-5



SEE MAP F-2

H-25 ⇒ H-28 MAPLE GARDEN PARK



FORM I

NA

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET _____ OF _____

WATERSHED

FORM COMPLETED BY

Name:

Municipality: MARPLE

County:

Name:

Telephone:

Date:

For County Use:

DEFINITION

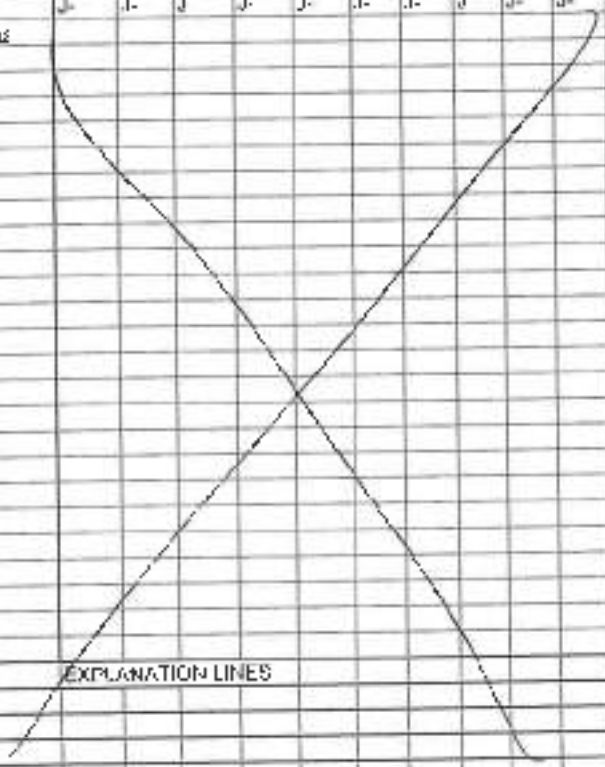
FLOOD HAZARD AREA:

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD.

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				

WATER QUALITY PROBLEM AREAS FORM J SHEET ____ OF ____

WATERSHED					FORM COMPLETED BY							
Name					Name:							
Municipality	MAPLE				Telephone:							
County					Date:							
SITE	J-	J-	J	J-	J-	J-	J-	J	J-	J-	J-	J-
Types of Water Quality Problems												
High Community Tolerance												
High Temperature												
High Turbidity												
Hydrocarbon Pollution												
Low Community Diversity												
Low Dissolved Oxygen												
Low pH												
Nutrient Enrichment												
Poor Habitat												
Other(Explain on Line No.												
Potential Cause(s)												
Agriculture												
Construction Site												
Erosion												
Lake Discharge												
STP Outfall												
Other(Explain on Line No.												
Frequency												
Year Most Recent Occurrence												
Year First Known Occurrence												
Source of Information												
County Water Quality Study												
Survey												
Other(Explain on Line No.												
	EXPLANATION LINES											
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												



Form O - Outfall Data

Person: _____ Date: _____ Time Since Last Rain was _ 72 Ho

Quantity of Last Rain = 0.1 Inches: > 0.1 Inches Day

Municipality: MAPLE Name of receiving water: _____

Pipe Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)

Staining Severity:

0=No staining present (No visible flow, no visible deposits or debris, no excessive sediment, no erosion present)

1=Minor staining present (flow visible, staining, no excessive deposits, some threads or debris, some algae, no or poor

2=Significant staining present (flow visible, heavy staining, excessive deposits, algae visible

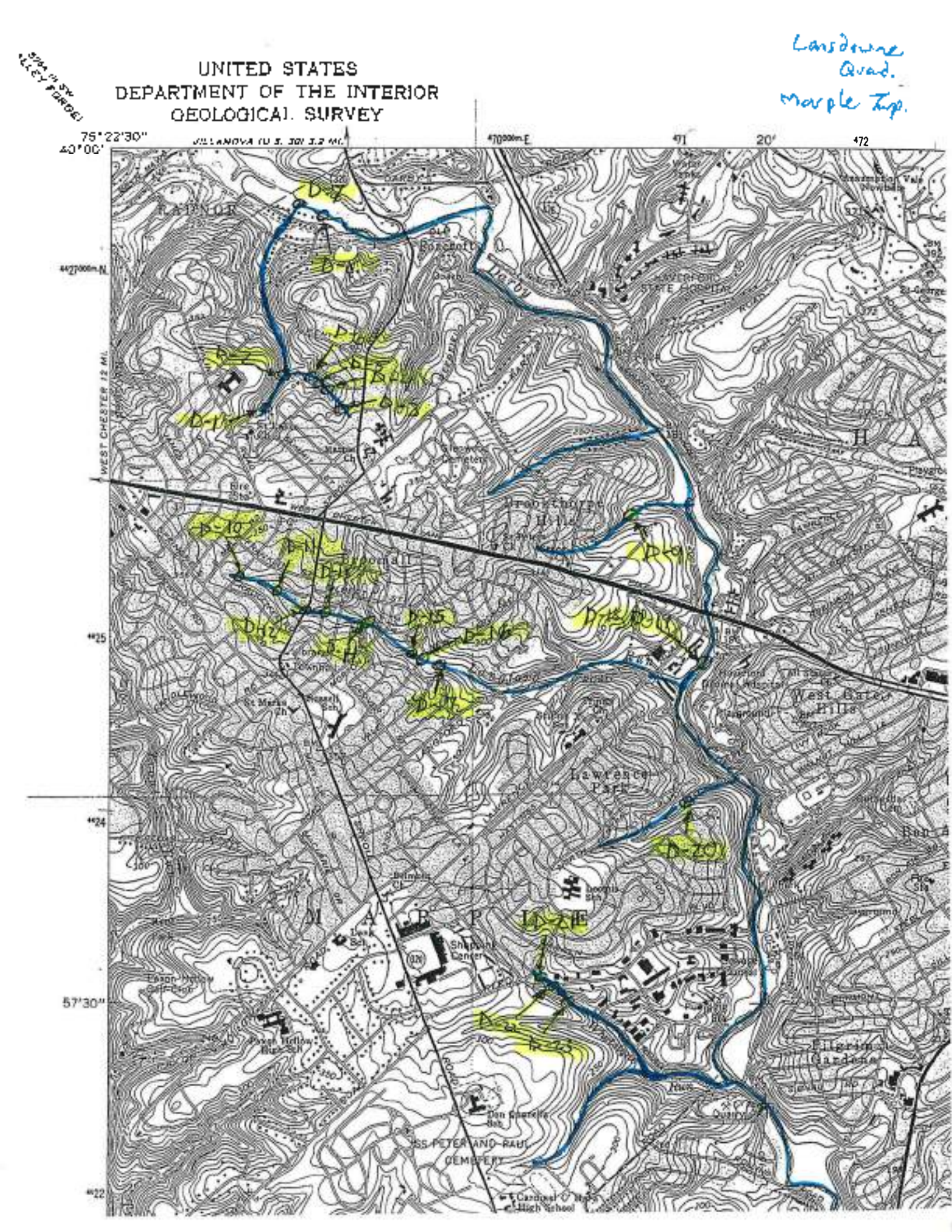
3=Severe staining present (flow visible, heavily stained, excessive deposits, algae visible

b=Added to bank or drain)

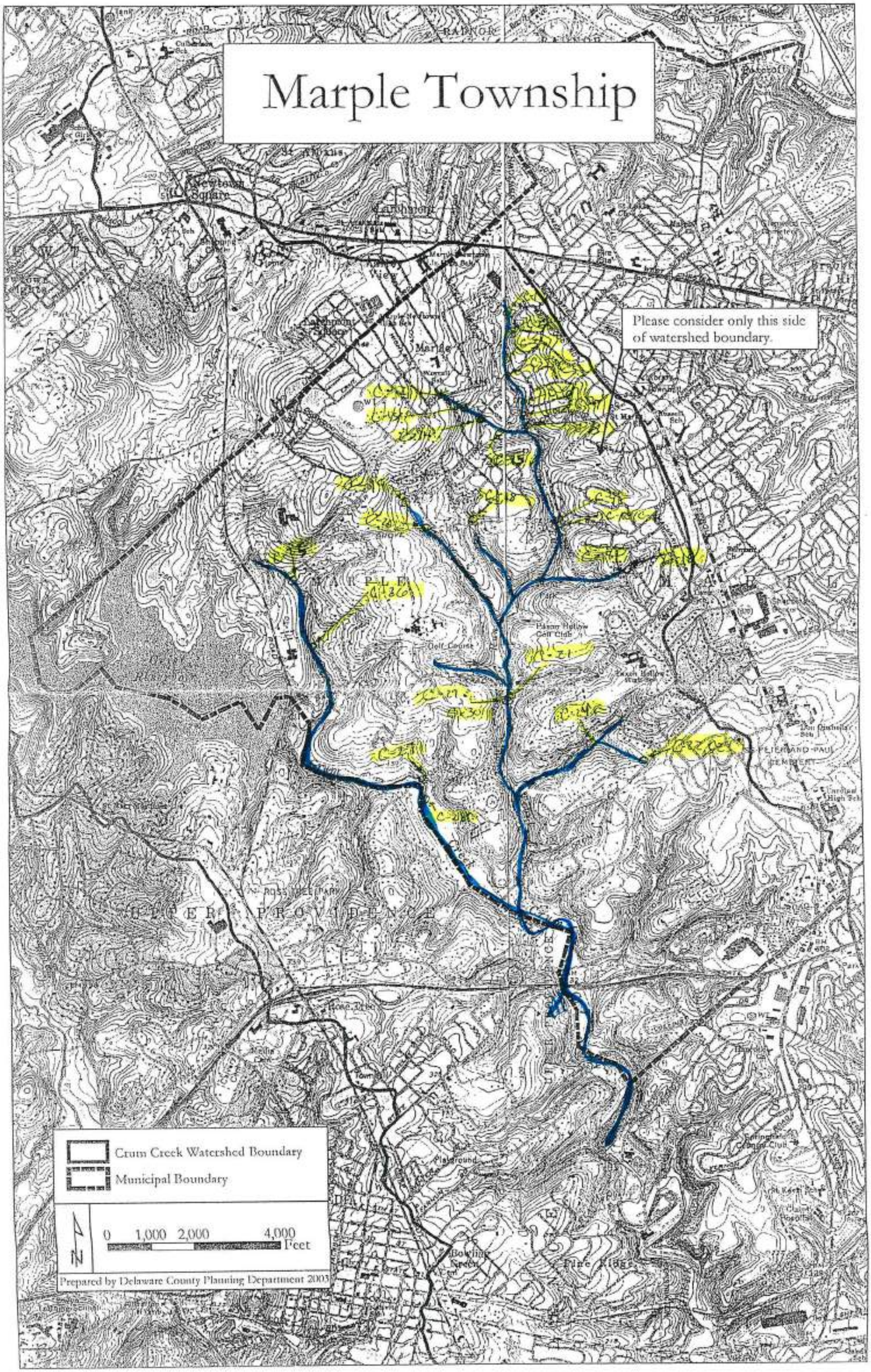
H:V = Horizontal:Vertical (ft:ft)

*2:1 = Vertical rectangular channel

NOTES:


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Lansdowne Quad.
Marple Twp.
75°22'30"
40°00'
VILLANOVA (U.S. 30) 3.2 MI.
470000m.E
471
20'
472
4427000m.N
WEST CHESTER 12 MI.
RADNOR
Bonsall
Darby
Broomall
Broomall
Lawrence Park
West Chester Hills
Ellerton Gardens
SS. PETER AND PAUL CEMETERY
4425
4424
57'30"
4422
D-7
D-8
D-9
D-10
D-11
D-12
D-13
D-14
D-15
D-16
D-17
D-18
D-19
D-20
D-21
D-22
D-23

Marple Township



MEDIA BOROUGH

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us

PART I - GENERAL INFORMATION

Municipality: Borough of Media

Contact Person: Jeffrey A Smith

WPAC Designee:

Title: Borough Manager

Address: 301 N Jackson St 2nd Floor

Media Pa 19063

Phone: 610-566-5210 Ext 242

Fax: 610-566-0335

Person Completing form (if different from Contact Person):

Name: Jim Jeffrey Code Enforcement Director

Address: 301 N Jackson St 2nd Floor

Media Pa 19063

Phone: 610-566-5210 x 246

Fax: 610-566-0335

E-mail: jim_jeffrey@mediaborough.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	✓	
Subdivision/Land Development Ordinance	✓	
Separate Stormwater Ordinance	✓	
Separate Floodplain Ordinance	✓	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors	✓	✓	✓	?
Municipal Engineering Department	✓	✓		
Municipal Planning Department	✓	✓	✓	
County Planning Department	✓	✓		
County Conservation District	✓	✓		
Zoning Hearing Board				✓
Consulting Engineer	✓	✓	✓	
Others (List Below				

C. Please provide **copies** of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	✓		
Comprehensive Land Use Plan	✓		
Existing Land Use Maps	✓		
Proposed Land Use Maps			
Zoning Maps	✓		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	✓
Participates in FEMA Emergency Program	✓
Participates in FEMA Regular Program	✓

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

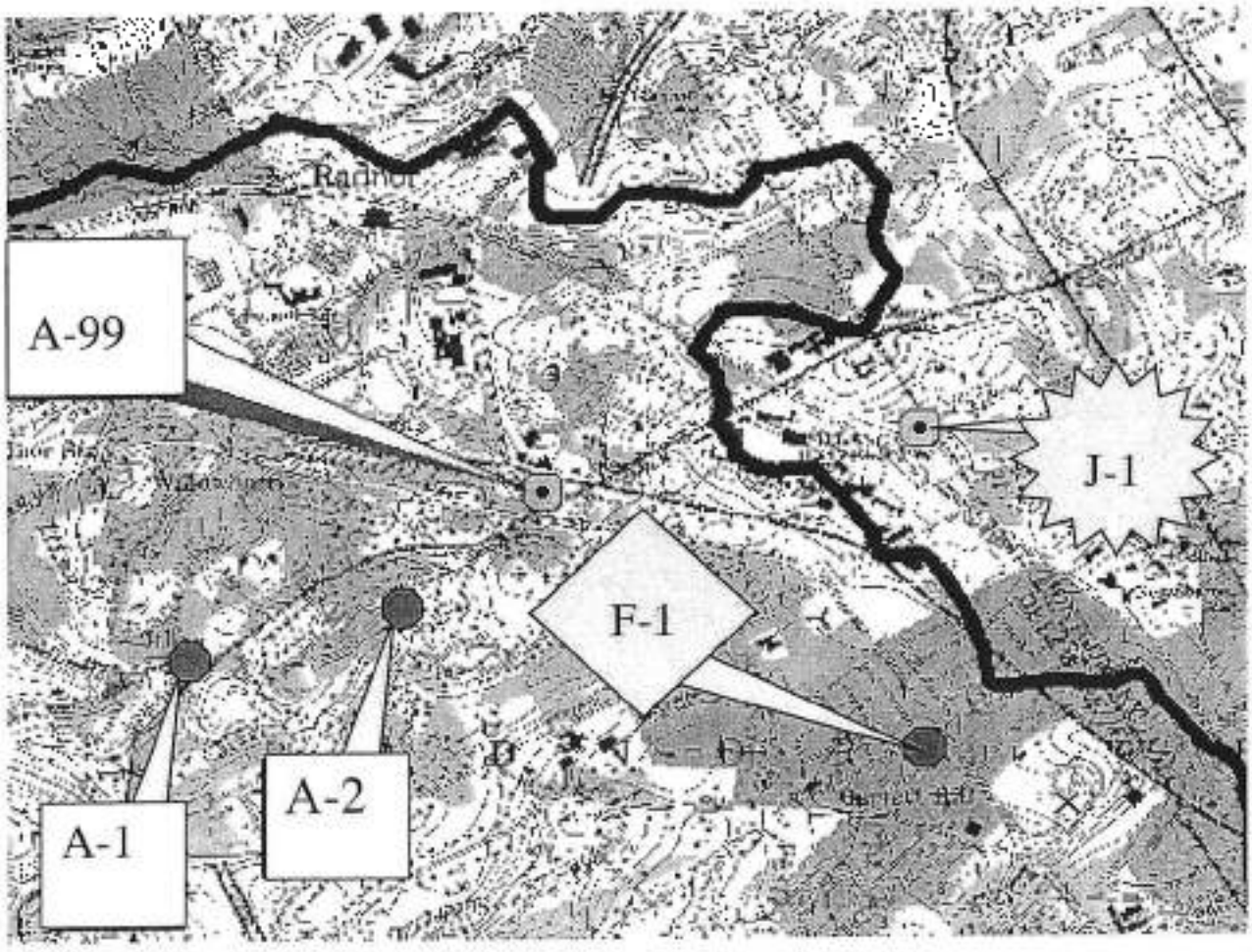
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide <u>detailed</u> descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help

Sample Location of Information from Data Collection Forms on the Municipal Map



Form Description Summary
Act 167 Watershed Storm Water Management Plan

Form	Description	Types of Examples	Sources of Information
A	Storm Water Problem Areas	Flooding Drainage Erosion/Sedimentation	Existing Studies or Reports Township Documentation Personal Memory Township Engineer
B	Obstructions	Bridges Culverts Fill Structures	Owner of Structure Township Files Subdivision Applications Roadmasters Township Engineer
C	Existing Flood Control Projects	Channel, Excavation Rip-Rap Floodwalls, etc.	Township Records Township Engineer Owner of Facility
D	Proposed Flood Control Projects	Channel Excavation Rip-Rap Floodwalls, etc.	Township Records Township Engineer Owner of Facility
E	Existing Storm Water Control Facility	Detention Basins Recharge Basins Roof Top Storage	Subdivision Files Township Engineer Owner of Facility
F	Proposed Storm Water Control Facility	Detention Basins Recharge Basins Roof Top Storage	Subdivision Files Township Engineer Owner of Facility
G	Existing Storm Water Collection System	Storm Sewers Man-Made Channels Diversions	Existing Plans Township Engineer Owner of System (Developers)
H	Proposed Storm Water Collection System	Storm Sewers Man-Made Channels Diversions	Existing Plans Township Engineer Owner of System (Developer)
I	Present & Projected Development in the Flood Hazard Area	Subdivision/Site Plans	Flood Insurance Studies Subdivision/Site Plans General Knowledge Township Engineer Private Flood Studies
J	Water Quality Problems	Construction Site Agriculture	Municipal Files Conservation District

STORM WATER PROBLEM AREAS - FORM A sheet __ of __

WATERSHED Name: Municipality County	FORM COMPLETED BY Name Telephone: Date:

MAP NO	A-99	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems													
Flooding	x												
Accelerated Erosion	x												
Sedimentation													
Landslide													
Groundwater													
Water Pollution	x												
Other (Explain)													
Explanation Line No (s)													
Cause(s)													
Storm Water Volume	x												
Storm Water Velocity	x												
Storm Water Direction	x												
Water Obstruction	x												
Other (Explain)													
Explanation Line No (s)													
Frequency													
Year Most Recent Occurred													
Year First Known to Occur													
Regularity													
More Than 1/Year	x												
Less Than 1/Year													
Only During Ages or Flow?													
Duration (If Applicable)													
Less Than One Day	x												
One Day + (Enter Days)													
Property Damages													
Loss of Life / Vital Services													
Private													
More Than One Owner													
Types of Properties													
Undeveloped													
Agricultural													
Residential													
Commercial	x												
Industrial													
Number of Properties													
-													
2-10	x												
11+													
Public Use Type(s)													
Explanation Line No (s)													
Solutions													
Suggested													
Explanation Line No (s)													
Formally Proposed													
Explanation Line No (s)													

EXPLANATION LINES

1
2
3
4

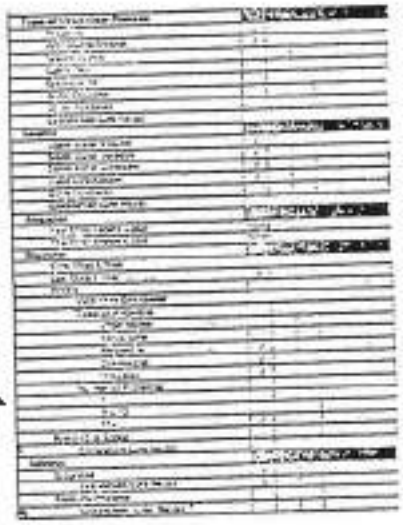
INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No (s)". Example 1, 2-3, etc.

f storm water problem occurred during and after Agnes, describe the requency of the problem after Agnes.



Use the explanation nes to list the types of ublic property damages e.g. roadways, hospitals, etc.

Enter the line nn (s) sed to list the map ID o. (s) for the proposed activities

Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, wall, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

EXISTING FLOOD CONTROL PROJECT FORM C SHEET ____ OF ____

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS
Name: _____ Municipality: _____ County: _____	Name: _____ Telephone: _____ Date: _____	Channel Excavation / Widening; Channel Realignment; Rock Riprap; Levee; Gabions; Pipe Channel; Dams; Floodwall; Concrete Lining
For County Use:		

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S (if known)	Owner Name, Address, and Phone
C-						
C-						
C-						
C-						
C-						

PROPOSED FLOOD CONTROL PROJECT FORM D SHEET ____ OF ____

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Name:	Channel Excavation / Widening	Levee	Dams
Municipality:	Telephone:	Channel Realignment	Gabions	Floodwall
County:	Date:	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complin. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C F S.		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITES FORM E. SHEET _____ OF _____

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: _____ Municipality: _____ County: _____	Name: _____ Telephone: _____ Date: _____	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name Address and Phone	Comments
E-				
E-				
E-				
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage /

PROPOSED FLOOD CONTROL PROJECT FORM F. SHEET ____ OF ____

WATERSHED

FORM COMPLETED BY

Name:

Telephone:

Date:

Name:

Municipality:

County:

For County Use:

DEFINITION

Storm Water Control Facility

A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates Start	Proposed Constr. Dates End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F-						
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

EXISTING STORM WATER COLLECTION FACILITIES FORM G. SHEET _____ OF _____

WATERSHED

Name:

Municipality:

County:

FORM COMPLETED BY

Name:

Telephone:

Date:

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

PROPOSED STORM WATER COLLECTION FACILITIES FORM F (10 YRS)

SHEET _____ OF _____

WATERSHED

Name:

Municipality:

County:

FORM COMPLETED BY

Name:

Telephone:

Date:

INSTRUCTIONS:

Map I.D. No.		System's Elements (X)			Measurements *				Material	Map I.D. Nos.**	Proposed Const. Dates		Design Data Avail.	Contact Person Name and Phone	Name of Facil Ownership and Maintenance Responsibility
					Pipe	Open Channel / Swale									
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End			
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														

* See measurement key on reverse side. ** Enter the storm water problem areas Map I.D. Nos. if proposed project will solve or reduce any / all of the drainage problems.

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET _____ OF _____

WATERSHED

Name

Municipality:

County:

For County Use:

FORM COMPLETED BY

Name:

Telephone:

Date:

DEFINITION

FLOOD HAZARD AREA:

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				

WATER QUALITY PROBLEM AREAS (FORM J)

Watershed
Name _____
Municipality _____
County _____

Form Completed By
Name _____
Telephone _____
Date _____

Site:	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems								
High Community Tolerance								
High Temperature								
High Turbidity								
Hydrocarbon Pollution								
Low Community Diversity								
Low Dissolved Oxygen								
Low pH								
Nutrient Enrichment								
Poor Habitat								
Other / Explanation Line No.								
Potential Causes(s)								
Agriculture								
Construction Site								
Erosion								
Lake Discharge								
STP Outfall								
Other / Explanation Line No.								
Frequency								
Year Most Recent Occurrence								
Year First Known Occurrence								
Source of Information								
Streamwatch								
County Water Quality Study								
Driveby								
COD Complaint Investigation								
Other / Explanation Line No.								

Explanation Lines
1. _____
2. _____
3. _____

Form O - Outfall Data

Person: O'Brien / Phillips Date: 02/09/04 Time Since Last Rain was ≥ 72 Hours: Yes: _____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 2 days (revised - 2/7/04) stop @ 0600

Municipality: Media Name of receiving water: Gayley Run - 1-5
Broomall Run - 6, 7, 8, 8A

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Description (and use of upstream drainage area.	Rating (0-2)	Head wall Yes/No
1	1 Disk 3	YES	8:40 AM	24" 8"	0	10'	8'	1 to 3	NO	NONE	RESID	0	YES
2	2 3	Yes	0905	No Pipe Eroded Track	0	1'	2'	1:2	NO	"	"	1	No
2A	4	Yes	0915	18"	0	2'	4'	1:2	NO	"	"	0	No
3	5	Yes	0940	36"	0	3'	14'	1:1	NO	"	"	Minor Debris	Yes
4	6	Yes	1000	24"	10"	18"	15'	1:2	No	Clear	"	M.D. 0	Yes
5	7	Yes	1010	18"	0	2-3'	10'	1:1	No	None	Comm + Res	Debris 1	No
6	8	Yes	1035		0	3'	8'	1:3	No	Clear	Res	0	No
7													
8	9	Yes	1100	18	0	15'	30'	1:1	No	Clear	Res	0	No
8A	10	Yes	1105	15	0	15'	20'	1:1	No	None	Res	0	Yes

(all outside water shed)

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or dams)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES: Rating for outfall for #7 is same as for #6

Form O - Outfall Data

Person: O'Brien / Phillips Date: 2/9/04 Time Since Last Rain was ≥ 72 Hours: Yes No

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 2½

Municipality: Media Name of receiving water: Brushell Lake

Pipe Scale #	Photo #	Storm Drain? Yes/No Not sure	Time (EDST) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)	Hazardous Yes/No
9	4	Yes	1330	12"	0	2'	2'	1:1	No	Clear	Res	0	No
10	1	Yes	12:55	2@ 15" pipe	0	20"	20'	1:4	No	Clear	Res	0	Yes
10A	2	Yes	1300	15" pipe	0	0"	2'	1:1.5	No	N/A	Res	1	Yes
10B	3	Yes	1306	18"	0	18"	Stream	Stream	No	N/A	"	0	No
11	5	Yes	1340	15"	0	18"	8'	1:3	No	N/A	Res	0	Yes
12	6	Yes	1350	8"	0	3'	Stream	1:5	No	Stream Clear	Res	0	Yes
13	7	Yes	1355	30"	0	5'	Stream	1:5	No	" "	Res	0	Yes
14	8	Yes	1405	12"	0	2'	Ditch	1:4	No Flowing	Clear	"	0	Yes
15	9	Yes	1410	18"	0	2'	15'	1:5	No	N/A	Res	0	No
16	10	Yes	1430	2@ 1.05" 1-36"	2-3"	6'	20'	1:1	Yes ~~Dry Pipe~~ Flowing	Clear	Res	0	Yes

(all notes with Chad)

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

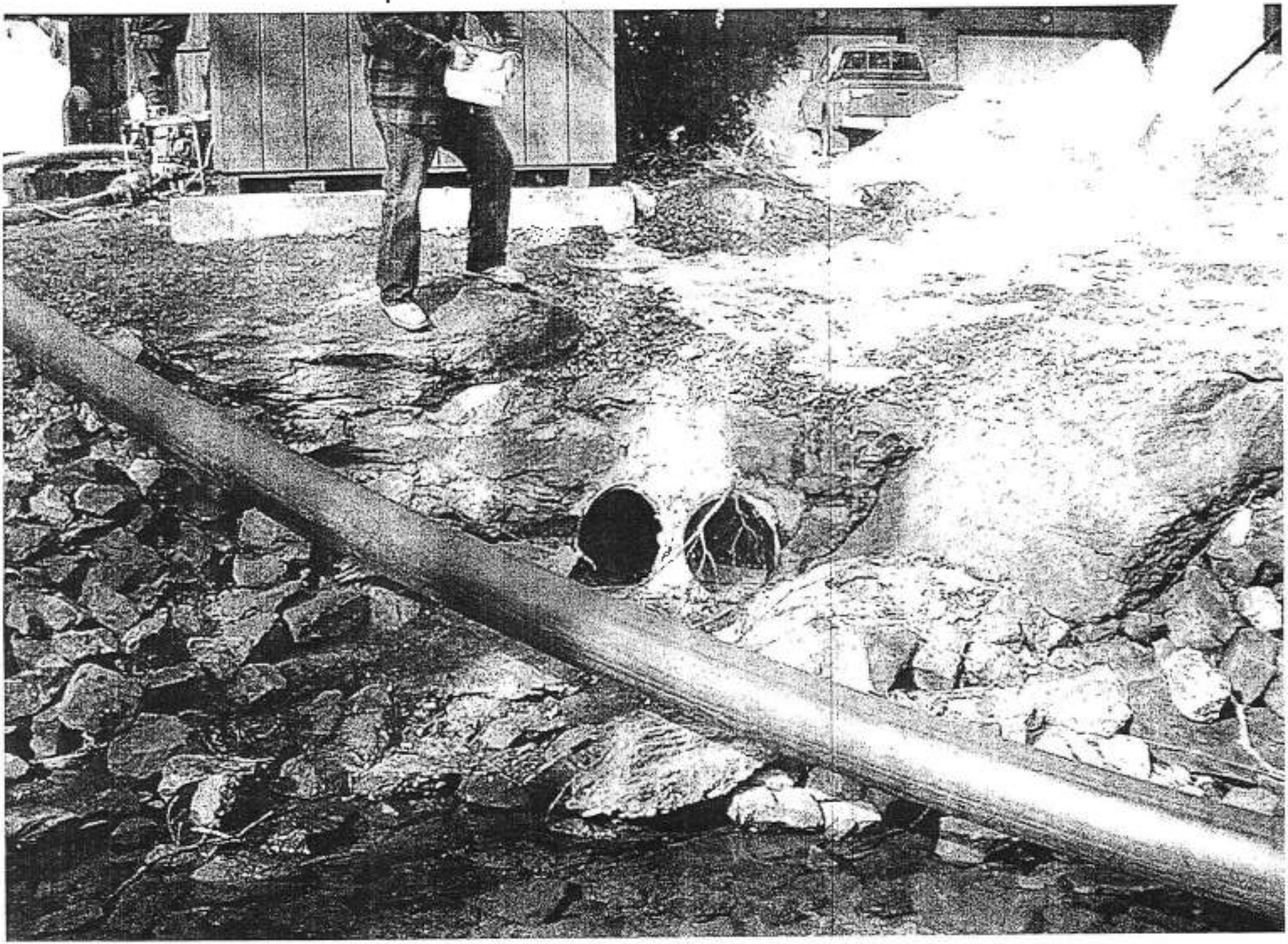
1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*(1:1 = Vertical - rectangular channel)

NOTES:





Media Disk 4 - Photo # 2 Pipe Smoke # 105

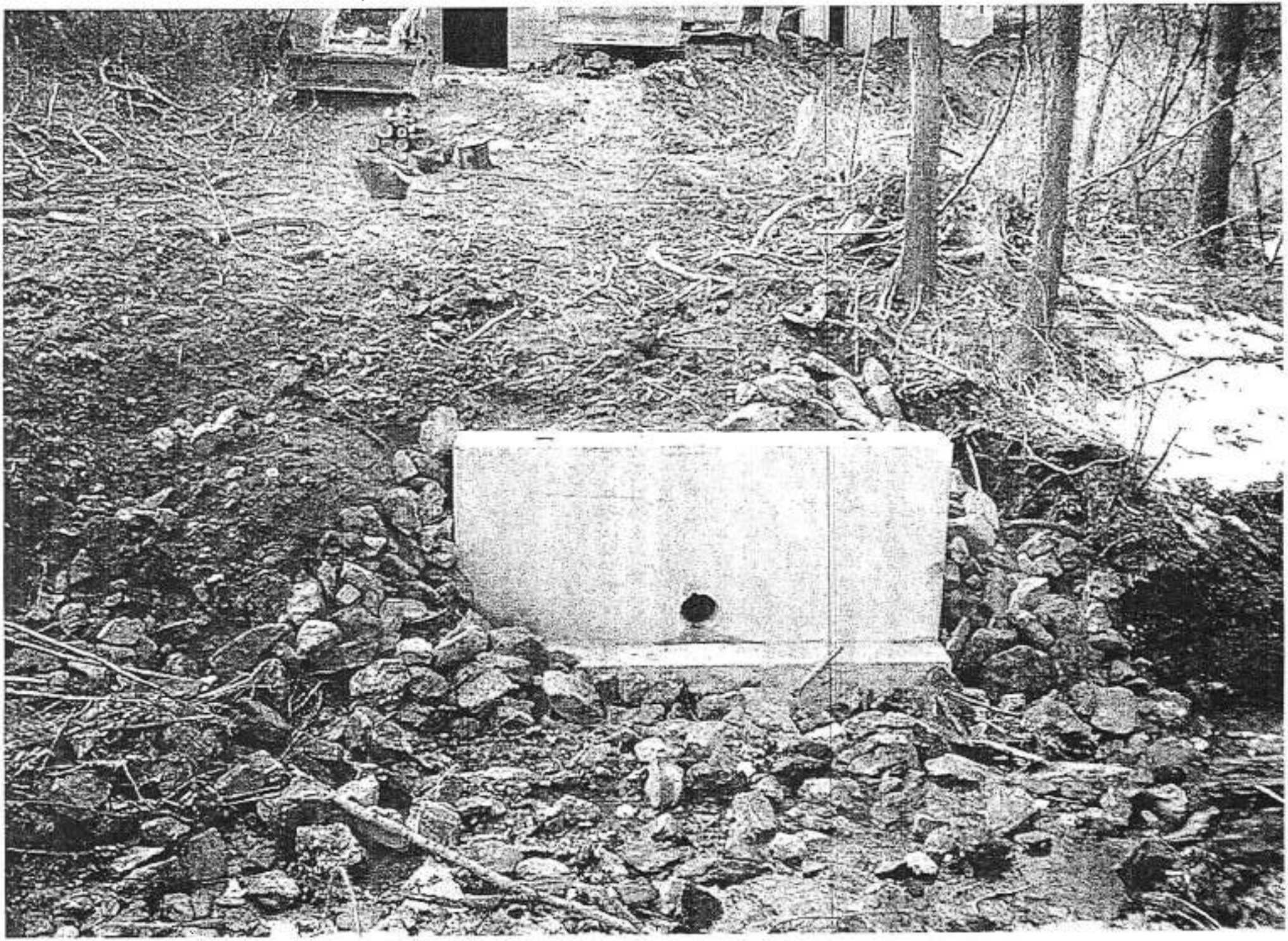


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2/11/0-





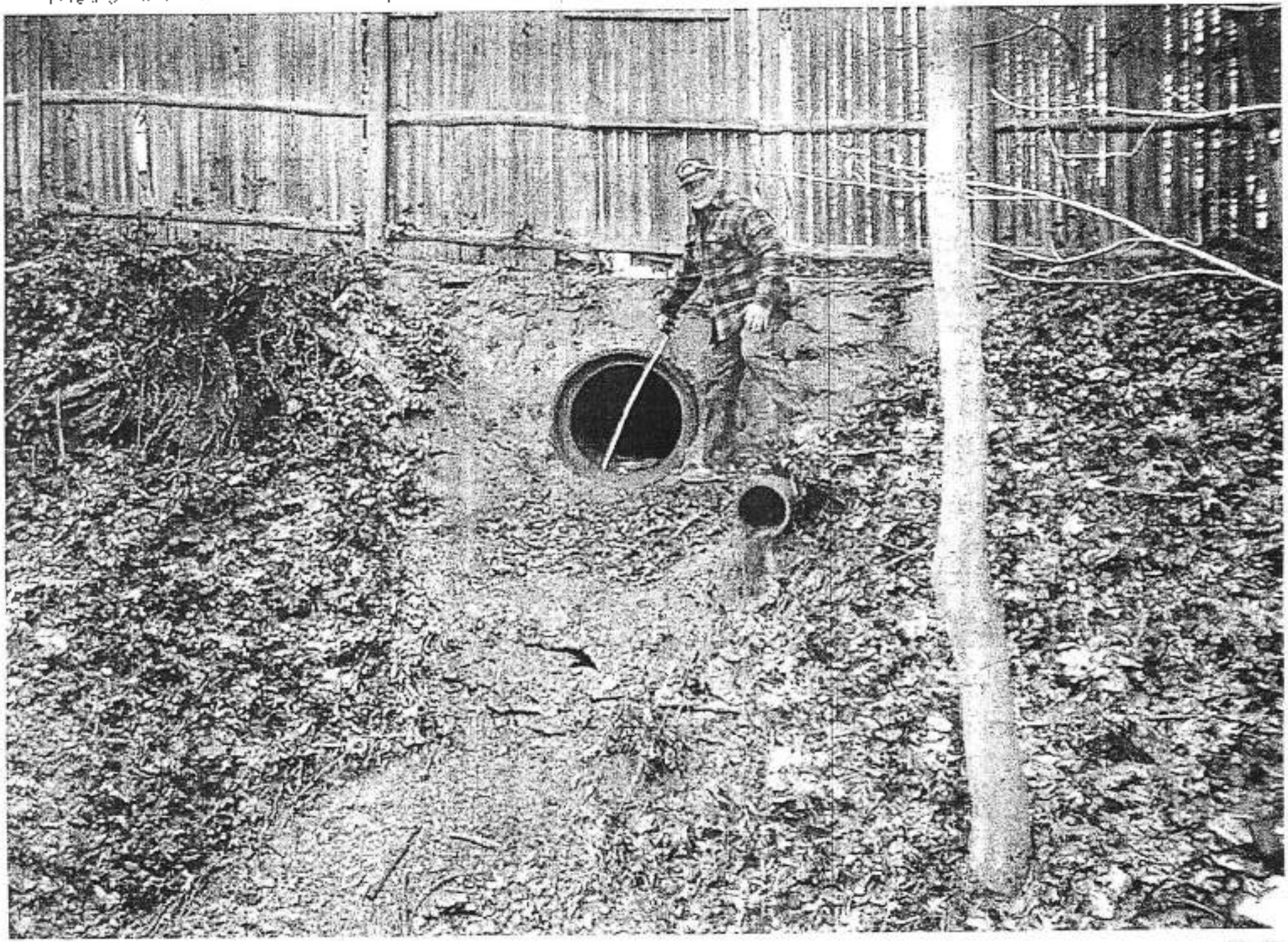


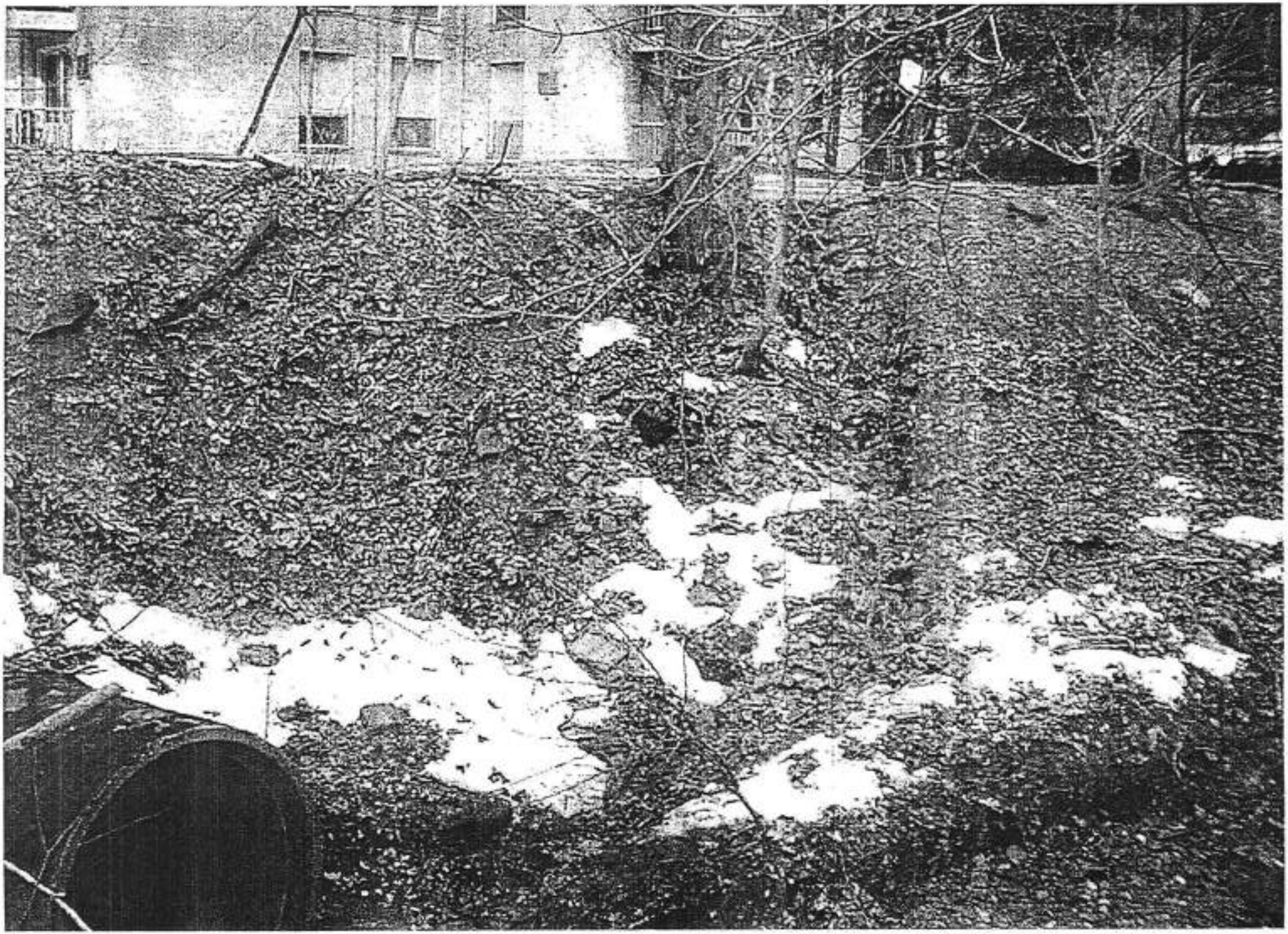


















Media Disk 3 - Photo # 6 - 1 p. Duplicate # 4

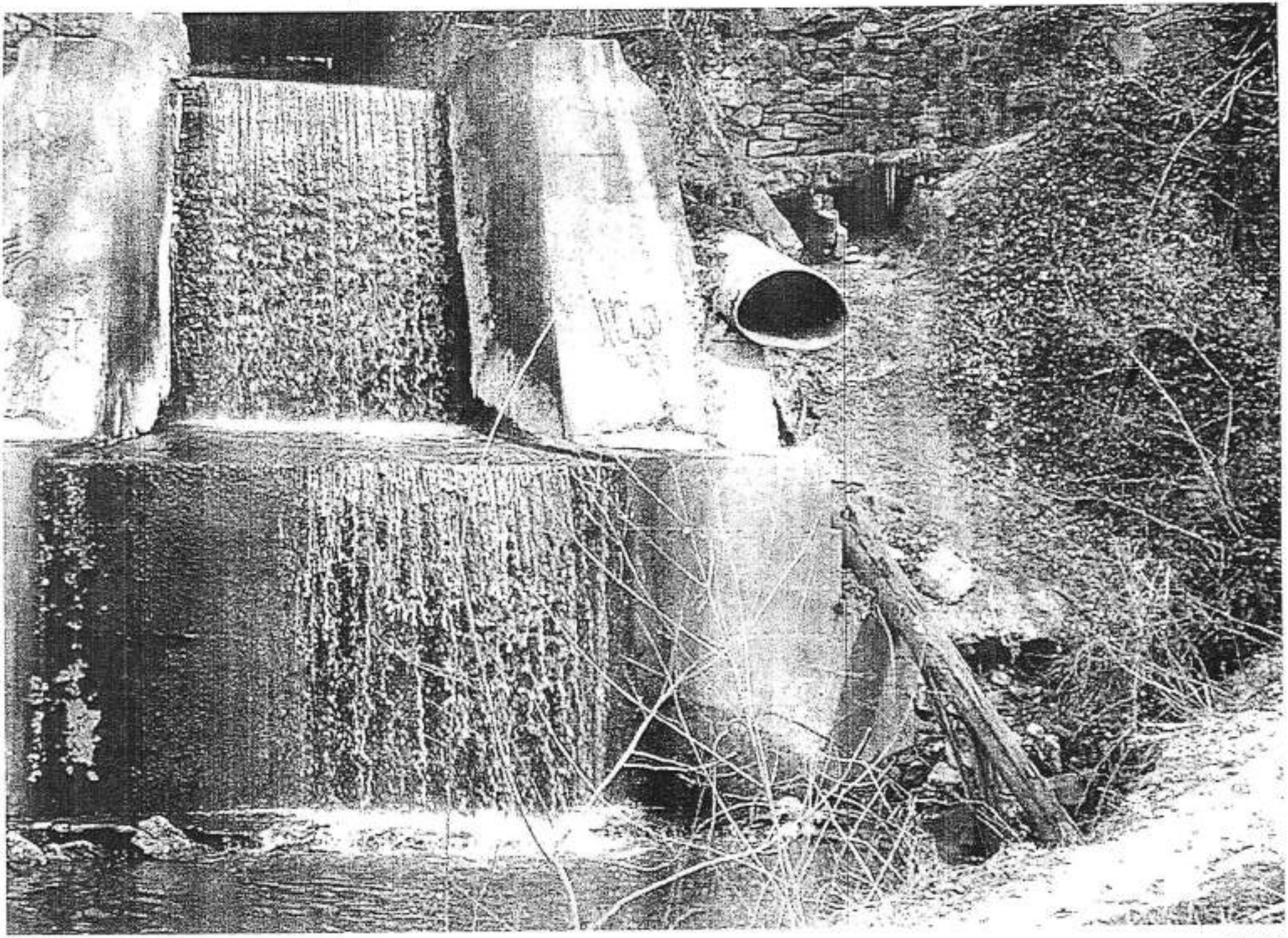






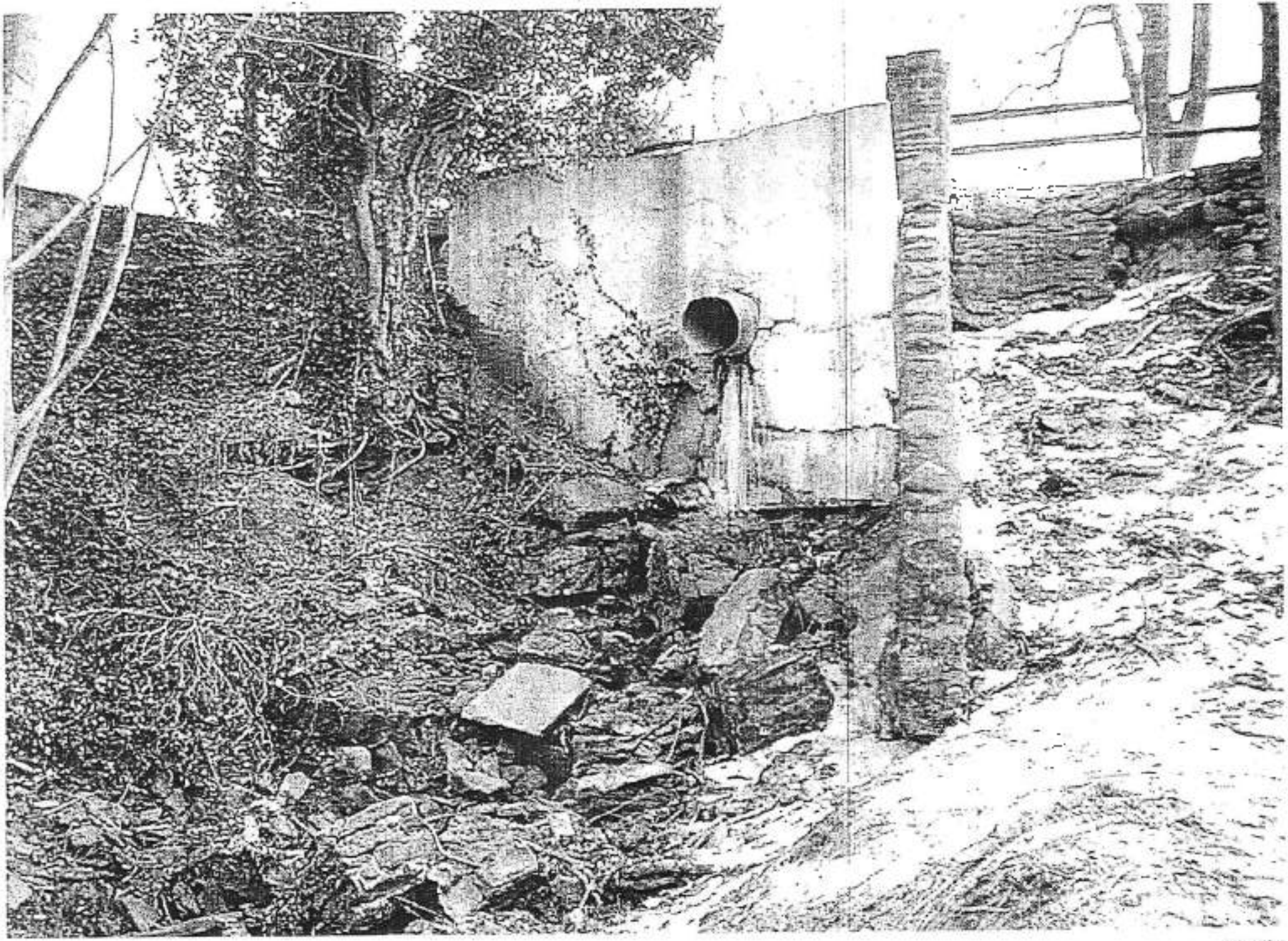
file://A:\MVC-008F.JPG

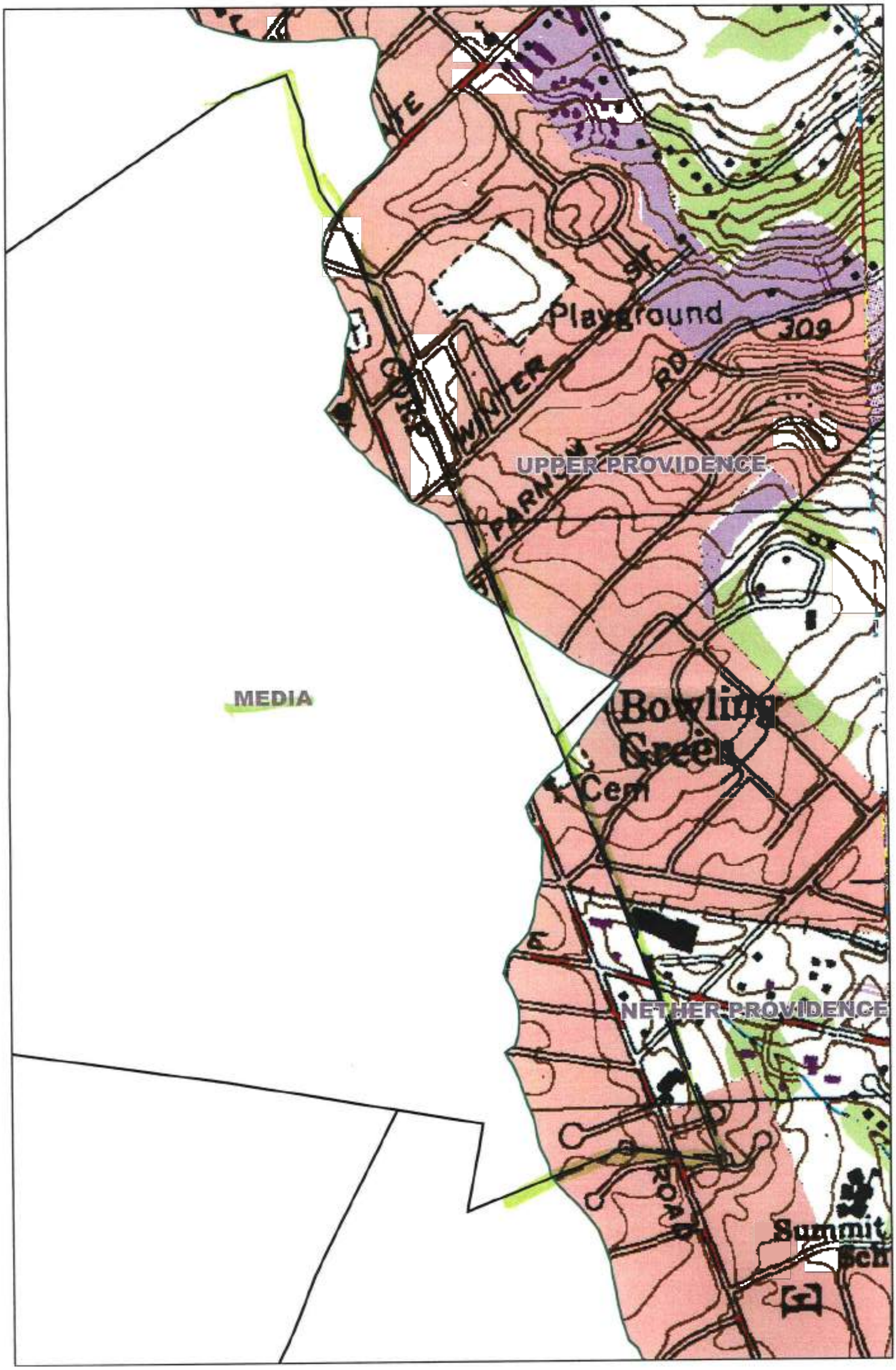
2/11/04



File:A:\MVC-009F.JPG

2/11/04





CRUM CREEK WATERSHED - LOCATOR MAP

MORTON BOROUGH

Turning Ideas Into Reality

CATANIA ENGINEERING ASSOCIATES, INC.

Consulting Engineers & Land Surveyors

June 14, 2005
File No. 83500-115-CC

Chris Gallagher
Delaware County Planning Department
Office of Housing and Community Development
600 N. Jackson Street, Room 101
Media, PA 19063

RE: Crum Creek Watershed Act 167
Morton Borough

Dear Mr. Gallagher:

Enclosed, please find the completed municipal survey forms for the Crum Creek Watershed Act 167 Stormwater Management Plan.

If you have any questions, or require any additional information, please do not hesitate to contact me.

Very truly yours,

Jamie H. Bricker

Jamie H. Bricker, E.I.T.
for Catania Engineering Associates, Inc

JHB/pm
Enclosures
cc: Martha Preston, Secretary

520 W. MacDade Boulevard, Milmont Park, Pennsylvania 19033-3311
Phone: (610) 532-2884 Fax: (610) 532-2923 E-Mail: CEAINC1@aol.com

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: Morton Borough

Contact Person: Martha Preston, Secretary

WPAC Designee: Charles J. Lallicrapp, Jr.

Title: Councilman

Address: Highland & Sycamore Avenues

Morton, PA 19070

Phone: 610-543-4565

Fax: 610-543-8392

Person Completing form (if different from Contact Person).

Name: Jamie H. Bricker

Address: 520 W. MacDade Boulevard

Milmont Park, PA 19033-3311

Phone: 610-532-2884

Fax 610-532-2923

E-mail: jamie@cataniaengineering.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	No. 588	
Subdivision/Land Development Ordinance		X
Separate Stormwater Ordinance	pending	
Separate Floodplain Ordinance	No 623	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors	X	X		
Municipal Engineering Department				
Municipal Planning Department	X			
County Planning Department	X			
County Conservation District	X			
Zoning Hearing Board			X	X
Consulting Engineer	X			
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

Morton Borough Zoning Ordinance No. 588

Morton Borough Flood Hazard District Overlay (Zoning Ordinance) No. 623

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	3/13/2002		
Comprehensive Land Use Plan	10/2002		
Existing Land Use Maps	10/2002		
Proposed Land Use Maps	10/2002		
Zoning Maps	1995		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	N
Participates in FEMA Regular Program	Y

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

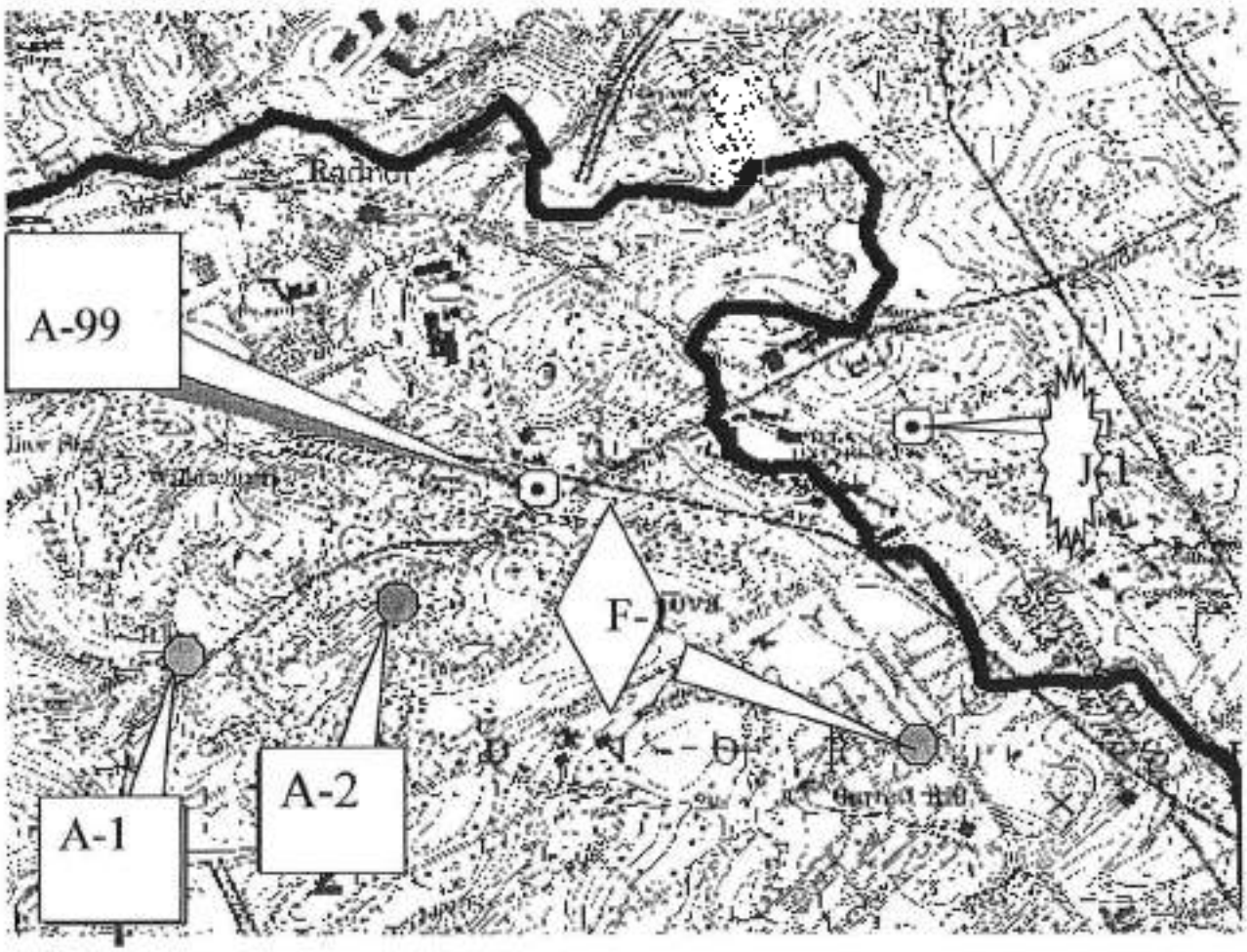
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality We appreciate your help

Sample Location of Information from Data Collection Forms on the Municipal Map



FORM A - STORM WATER PROBLEM AREAS SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		Before Filling Out Form, See Instructions on Back
Name:	Crum Creek	Name:	Jamie H. Bricker	
Municipality:	Morton Borough	Telephone:	610-532-2884	For County Use:
County:	Delaware	Date:	8/5/2004	

MAP NO. *	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems													
Flooding													
Accelerated Erosion													
Sedimentation													
Landslide													
Groundwater													
Water Pollution													
Other (Explain)													
Explanation Line No. (On Back)													
Cause (s)													
Storm Water Volume													
Storm Water Velocity													
Storm Water Direction													
Water Obstruction													
Other (Explain)													
Explanation Line No. (On Back)													
Frequency													
Year Most Recent Occurred													
Year First Known Occurred													
Regularity													
More Than 1 Year													
Less Than 1 Year													
Only During Agnes													
Duration (If Applicable)													
Less Than 1 Day													
1 Day + (Enter Days)													
Property Damage													
Loss of Life/Vital Services													
Private													
More Than One Owner													
Types of Properties													
Number of Properties													
Public (List Types)													
Explanation Line No. (On Back)													
Solutions													
Suggested													
Explanation Line No. (On Back)													
Formally Proposed													
Explanation Line No. (On Back)													

* Include Map ID No. if found on any other form listing proposed facilities.

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Jamie H. Wenger	Channel Excavation / Widening	Levee	Dams
Municipality:	Morton Borough	Telephone	610-532-2884	Channel Realignment	Gabions	Floodwall
County:	Delaware	Date:	9/5/2004	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood		Owner Name, Address, and Phone
				Frequency Yrs.	Discharge C.F.S (if known)	
C-	NONE No portions of Crum Creek or any of its tributaries lie in Morton					
C-						
C-						
C-						
C-						

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Jamie H. Bricker	Channel Excavation / Widening	Levee	Dams
Municipality:	Morton Borough	Telephone:	610-532-2884	Channel Realignment	Gabions	Floodwal
County:	Delaware	Date	8/5/2004	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complitn. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-	None No portions of Crum Crk or any of its tributaries lie within Morton.										
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Crum Creek Municipality: Morton County: Delaware	Name: Jamie H. Bricker Telephone: 610-532-2884 Date: 8/5/2004	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-	None No storm water control facilities exist within Morton Borough			
E-				
E-				
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED STORM WATER CONTROL FACILITIES FORM F. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Crum Creek Municipality: Morton County: Delaware	Name: Jamie H. Becker Telephone: 610-532-2684 Date: 8/5/2004	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites

For County Use:

Map ID No	Type of Storm Water Control Facility	Proposed Constr. Date Start	Proposed Constr. Date End	Map No: Form A*	Contact Person Name, Address and Phone	Comments
F-	None No stormwater control facilities are proposed within Morton Borough.					
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the stormwater problem area's Map ID No. if the proposed project will solve or reduce one / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Sem-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET 1 OF 1

WATERSHED

Name: Crum Creek
Municipality: Morton
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2684
Date: 8/5/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-	NONE											
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

*See measurement key on reverse side

FORM H

PROPOSED FLOOD CONTROL PROJECT FORM H SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	INSTRUCTIONS
Name: Crum Creek	Name: Jamie H. Bricker	On the map for proposed stormwater collection systems, diagram each proposed system. Indicate a map point to show changes in system elements, pipe size, pipe direction and connections to existing systems. For proposed additions to existing systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed, new system and one for each existing system having one or more proposed additions. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher (if H-3 ends one system, begin the next with H-23). Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system form and map. See Sample Diagrams and Form on Reverse.
Municipality: Morton	Telephone: 610-532-2884	
County: Delaware	Date: 8/5/2004	

Map ID No.		System's Elements (x)			Measurements*				Material	Map I.D Nos.**	Proposed Constr. Dates		Design Data	Contact Person	Name of Final Ownership and
					Pipe	Channel / Swale									
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Available	Name and Phone	Maintenance Responsibility
H-	H-	NONE													
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														

*See measurement key on reverse side. **Enter the stormwater problem areas' Map I.D. Nos., if proposed project will solve or reduce any or all of the drainage problems.

FORM I

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM I. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		DEFINITION
Name:	Crum Creek	Name:	Jamie H. Bricker	FLOOD HAZARD AREA
Municipality:	Morton	Telephone:	610-532-2884	A normally dry land area that has been or is susceptible to being inundated by the 100-year flood
County:	Delaware	Date:	8/5/2004	
For County Use:				

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1-	NONE There are no flood hazard areas in the Crum Creek watershed			
1-	portion of the Borough			
1-				
1-				
1-				
1-				
1-				

Form J

WATER QUALITY PROBLEM AREAS FORM J. SHEET ____ OF ____

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Janice H. Bricker
Municipality	Morton Borough	Telephone.	610-532-2884
County:	Delaware	Date:	8/5/2004

SITE	J-	J-	J	J-	J-	J-	J	J-	J-	J-	J-
Types of Water Quality Problems											
High Community Tolerance	NONE										
High Temperature											
High Turbidity											
Hydrocarbon Pollution											
Low Community Diversity											
Low Dissolved Oxygen											
Low pH											
Nutrient Enrichment											
Poor Habitat											
Other/Explanation Line No											
Potential Source(s)											
Agriculture											
Construction Site											
Erosion											
Lake Discharge											
STP Outfall											
Other/Explanation Line No											
Frequency											
Year Most Recent Occurrence											
Year First Known Occurrence											
Source of Information											
County Water Quality Study											
Survey											
Other/Explanation Line No											

EXPLANATION LINES

1 Headwaters Crum Creek Watershed Industries in Morton Borough

2

3

4

5

6

7

8

9

10

Form O - Outfall Data

Person: Jamie H. Wenger Date: 2/26/04 Time Since Last Rain was > 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain: Two (2/24/04)

Municipality: Morton Borough Name of receiving water: Crum Creek

Pipe Sample #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
None												

Rating System:

0=No Observed Impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

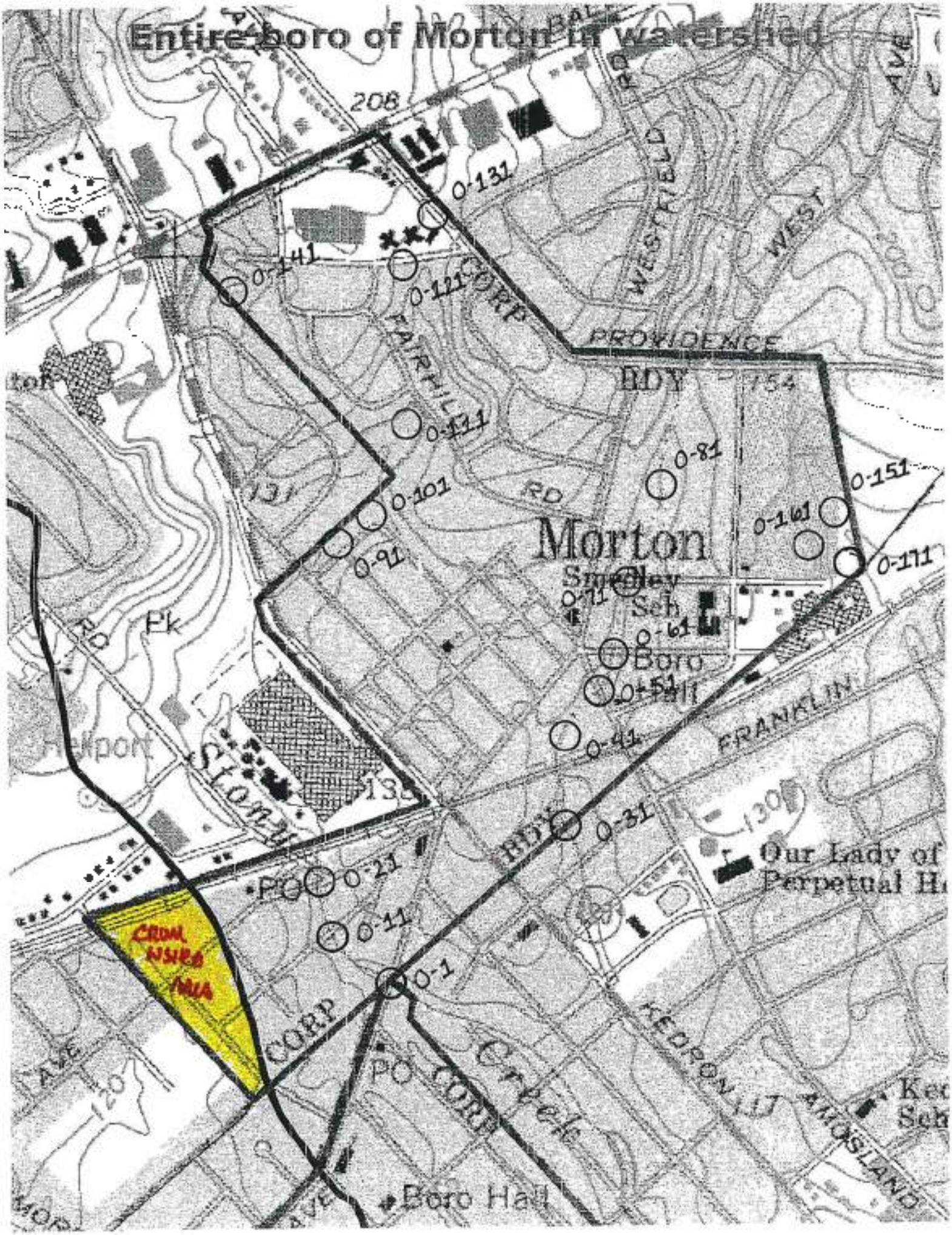
2=Impairment - needs investigation (flow exhibits dye odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked outlet, bent or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Morton Borough does not have any storm sewers or appurtenances connecting to outfalls on Crum Creek or in the Watershed


Entire boro of Morton in watershed
208
0-131
0-141
0-121
CORP
PROVIDENCE
RDY
754
0-111
0-81
0-151
0-101
RD
0-161
Morton
0-91
0-171
Sch
0-71
0-61
Boro
Hall
0-51
0-41
FRANKLIN
0-31
0-21
0-11
0-1
CRDM
NSRB
MIA
CORP
PO
Creek
Boro Hall
Our Lady of
Perpetual H
Pk
PO
Stom
135
130
120

Form O - Outfall Data

Person: Jamie H. Wenger Date: 2/26/04 Time Since Last Rain was > 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches > 0.1 inches Days Since Last Rain: Two (2/24/04)

Municipality: Morton Borough Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (1-3)
None												

Rating System:

1=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

2=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, color, algae, pipe in poor condition)

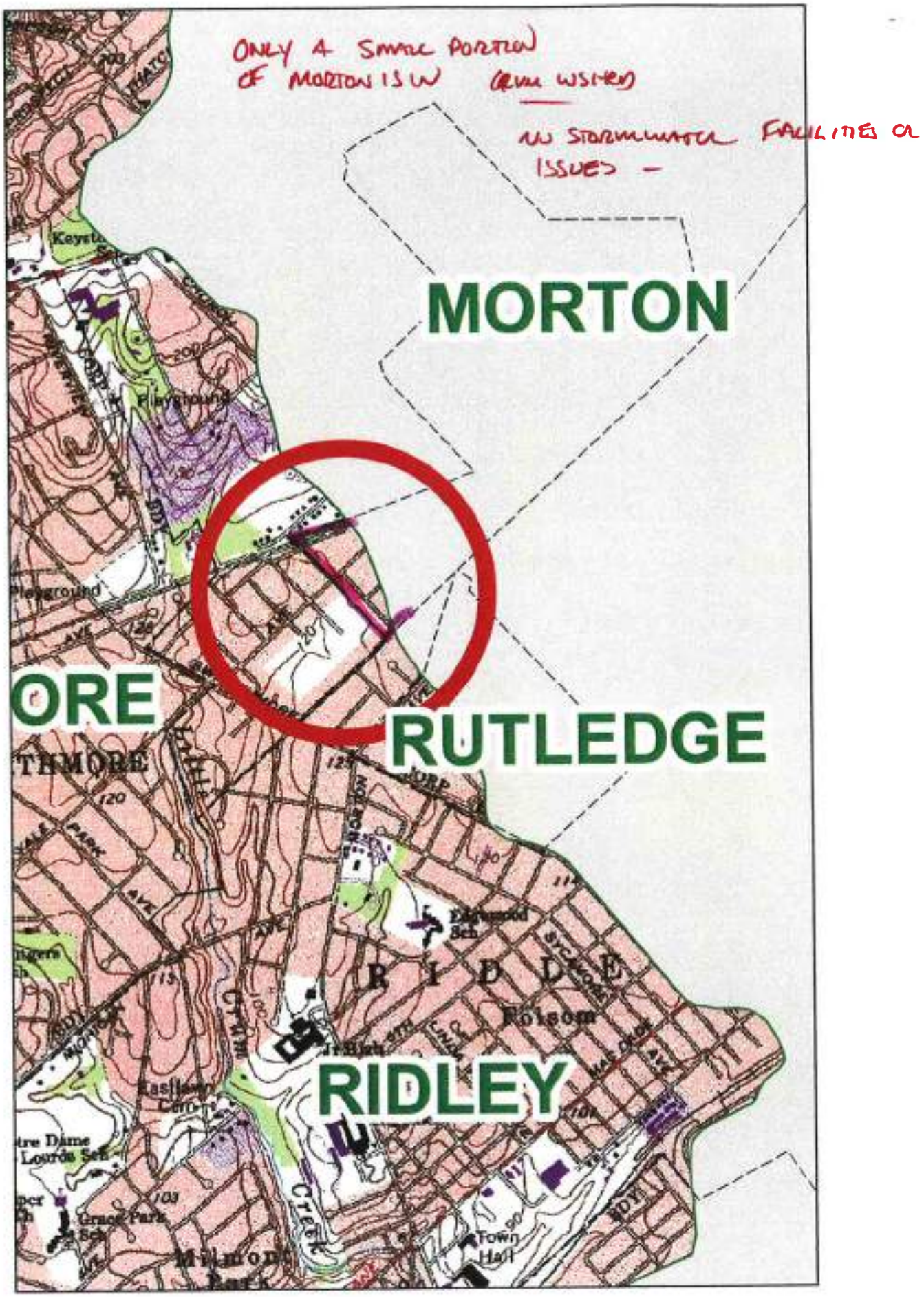
3=Impairment - needs investigation (flow exhibiting odors, foam, suds, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

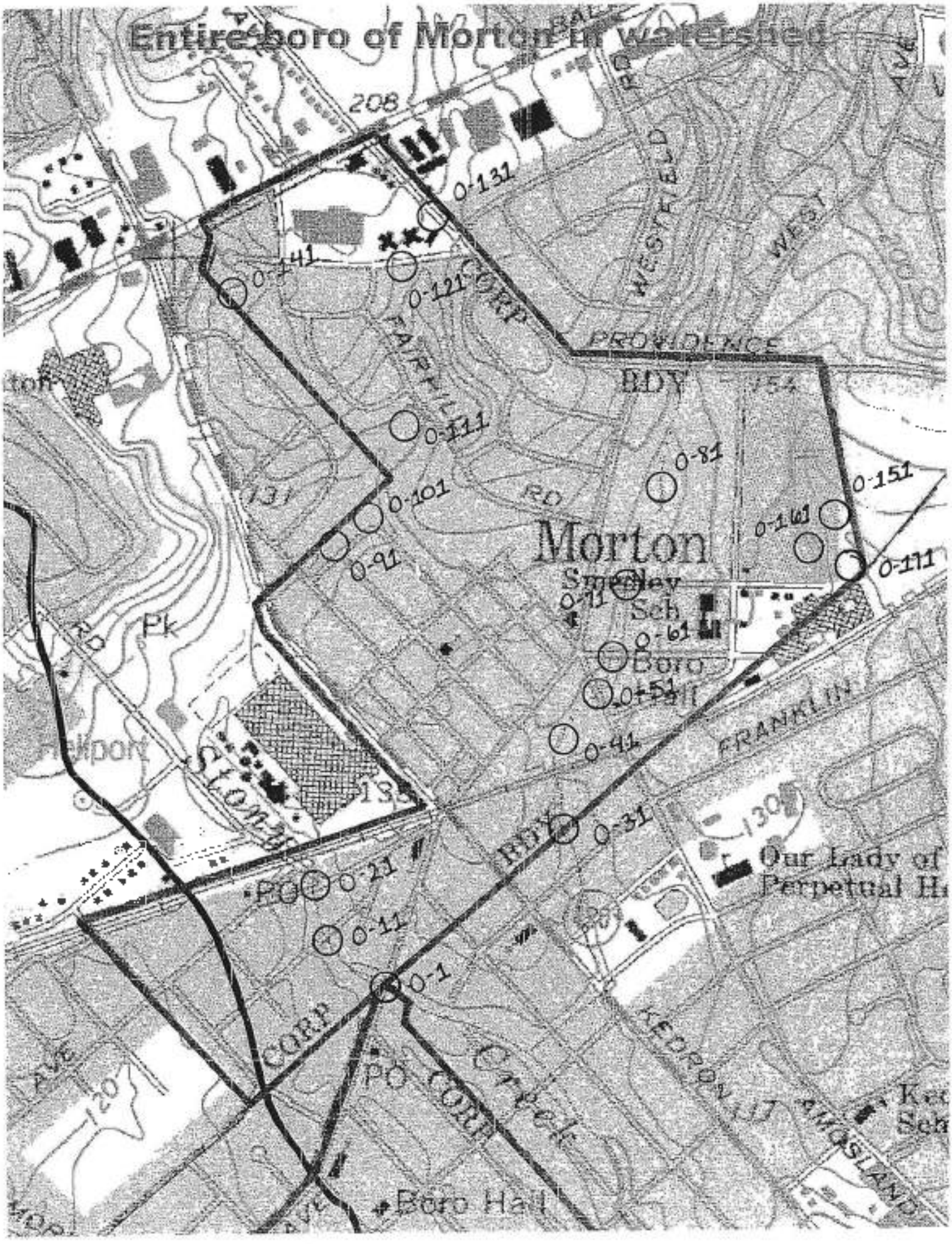
H:V = Horizontal to vertical ratio

*H:L = Vertical - non-regular channel

NOTES:

Morton Borough does not have any storm sewers or appurtenances connecting to outfalls on Crum Creek or in the Watershed


ONLY A SMALL PORTION OF MORTON IS IN
NO STORMWATER FLOODING OR ISSUES -
MORTON
ORE
RUTLEDGE
RIDLEY
Playground
Playground
Folsom
Creek
Creek
Town Hall


Entire boro of Morton in watershed
208
0-131
0-141
0-121
CORP
PROVIDENCE
BDY
0-111
0-81
0-151
0-101
RD
Morton
0-161
0-91
0-111
Sch
0-61
Boro
0-51
0-41
FRANKLIN
Stone
0-31
RD
0-21
PO
0-11
0-1
CORP
PO
Creek
Boro Hall

NETHER PROVIDENCE TOWNSHIP

TOWNSHIP OF NETHER PROVIDENCE

214 Sykes Lane, Wallingford, PA 19086-6350
(610) 566-4516 Fax (610) 892-2890

John P. Kennedy, President
5th Ward
David L. Hackett, Vice President
1st Ward
Sara Lynn Petrosky
2nd Ward
J. Manly Parks
3rd Ward
John J. Salvucci
4th Ward
Robert E. O'Connor
6th Ward
Robert M. Firkser
7th Ward

Gary J. Cummings, Manager
Douglas C. Roger, Jr. Solicitor
Catania Engineering
Theresa H. White, Treasurer

BORTON LAWSON DELAWARE VALLEY OFFICE
___ RB ___
___ PAD ___
___ MJW ___
WSB
___ PAR ___
___ ADMIN ___
CORRESPONDENCE
NOV 2 1 2005
PROJECTS

June 28, 2005

Mr. Chris Gallagher
Delaware County Planning Department
Court House/Government Center
201 W. Front Street
Media, PA 19063

Re: Storm Water Outfall Mapping

Dear Mr. Gallagher:

Enclosed for your file please find copies of "Form O - Outfall Data" for all of Nether Providence Township as well as color pictures for each outfall listing. Also enclosed is a storm sewer map for Nether Providence Township.

Please note that the "C" indicates those outfalls entering an unnamed tributary to Crum Creek. "D" indicates outfalls to Dicks Run that is tributary to Crum Creek. "V" indicates outfalls entering Vernon Run which is tributary to Ridley Creek (enters in Rose Valley Borough). "B" indicates outfalls into Beatty Run which is tributary to Ridley Creek. "B + #" indicates outfalls into a tributary of Beatty Run which ultimately enters Ridley Creek.

Please feel free to contact me if you have any questions.

Yours truly,

Gary J. Cummings
Township Manager

Cc: Jerry Breitmayer
Charles Catania, Jr.
Gary Snyder, NP EAC
Board of Commissioners

Nutter Providence

FORM B - OBSTRUCTION DATA COLLECTION

SHEET ____ OF ____

Municipal Stream Obstruction Data

Records completed by: Brian Bond

Watershed: Tom Creek

Field work personnel: ____

Municipality/County: Providence

Date(s): 12/1 - 12/20/04

Type	Material	Inlet Condition
B - Bridge	CMP - Corrugated Metal Pipe	AW - Above
C - Culvert	CPP - Corrugated Plastic Pipe	AN - Annual
D - Ford	CPPSP - Corrugated Polypropylene Pipe	SW - Submerged
P - Pipeline	RCP - Reinforced Concrete Pipe	
	MCP - Metal Culvert Pipe	
	Other - Specify	

Map ID	Owner or Address of Obstruction	Capacity (CFS)	Nos. of	Opening Type: Part of Bridge?	Opening Type: Current Purpose	Opening Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Shape ⌒	Shape ⊓	Measurements: T	D	HT	W	PA	WPA	MATERIAL / INLET CONDITION	NOTES
											(ft)	(ft)	(ft)	(ft)	(ft)	sq ft		
NET1	Rockville Rd over Canal		1	✓						✓	4		12	14.3	4	90	Concrete	
NET2	" " " Private Drive		1	✓						✓	1		9	12		90	Concrete	
NET3	" " " Private Drive		1			✓					1		5	14		90	concrete, MW	MW
NET4	Dickelius under RR		1						✓		1		5.4	10		90	MSRR	
NET5	" " "		1	✓						✓	4		7	4.2		90	metal / wood	
NET6	Trumbly		1	✓														
NET7	Private under RR		1	✓						✓	3		2.5	20		90	metal wood	
NET8	Private		1			✓					3		3	10		90	concrete, MW	
NET9	Brandt + Coppess		1	✓						✓	3		10.5	13		90	Concrete, MW	
NET10	Avendale		1	✓						✓	3		4	32.5		90	Wood	
NET11	" "		1							✓	1		4	12		90	concrete	
NET12	Private		1							✓	1.5		4	9		90	concrete	
NET13	Private		1							✓	1.5		4	11		90	concrete	
NET14	" " Oak Knoll		1	✓						✓	1.5		4	19		90	concrete	
NET15	Culvert/Rockwood		1	✓			✓			✓	1.5		3	12		90	Concrete	
NET16	923 Rockville Rd		1				✓				2	5.5				90		
NET17	921		1				✓				2	5.5				90		
NET18	919		1				✓				2	5.5				90		
NET19	915		1				✓				2	5.5				90		
NET20	913		1				✓				2	5.5				90		
NET21	911		1				✓				2	5.5				90		
NET22	909 Amy Hamilton		1	✓						✓	6	-	10	85	-	90	concrete	
NET23	501 Rockville Rd		1				✓				2	5.5	-	-	-	90		No channel / Outfall
NET24	505		1				✓				2	5.5	-	-	-	90		
NET25	Residence in Rockville		1				✓				3	7	-	-	-	90	RCP / Poor SW	
NET26	709 Rockville Rd		1				✓				1.5	7	-	-	-	90	RCP / Poor	
NET27	709		1				✓				1.5	5	-	-	-	90	RCP / Poor	
NET28	709		2				✓				5	2	-	-	-	90	RCP / Poor	Culvert in
NET29	Residence		1								3	-	4	13	-	90	Wood	
NET30	Residence		1								3	-	4	6	-	90	Concrete	
NET31	709 Rockville Rd		1	✓						✓	1.5	-	4	6	-	90	Concrete	Could not Survey
NET32	" "		1	✓						✓	1.5	-	3	4		90	Steel	
NET33	" " Rockville		1			✓					1.5	-	3	9	-	90	Concrete / Wood	
NET34	Buck Mill Rd		1			✓					2	-	3.5	4	-	90	Concrete	
NET35	Rockville Rd		1	✓						✓	1.5	-	4	3	-	90	MSRR / Poor SW	
NET36	" "		1				✓				1.5	-	3	2	-	90	Concrete / Poor SW	

C:\GIS\Projects\Municipal\Data Collection Forms\Form B.xls

NET

FORM B - OBSTRUCTION DATA COLLECTION

SHEET 1 OF

Municipal Stream Obstruction Data

Watershed

Municipality/County

Records completed by:

Field work personnel:

Date(s):

Map I.D.	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part-V Recon?	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert	Opening Shape (✓): Body	T	D	W	W	DW	above	MATERIAL / INLET CONDITION	NOTES
								(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		
NET 1				✓											
NET 2				✓											
NET 3				✓											
NET 4				✓											
NET 5				✓			✓								

L:\GIS\Data\Misc-stormwater\Act167DOCS\DataCollectionForms\obsforms.xls

Form O - Outfall Data

Person: Breitmayer, Jerome Date: 6/15/05 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 5

Municipality: Nether Providence Township Name of receiving water: Ridley Creek

Pipe Swale #	Photo #	Sample Drawn? Yes/No Not Flowing	Time (00:00) military	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
V1	Ven1	Yes	12:00 PM	30"	0.1'	8'	14'	2:3	Yes	Clear	Res	1
V2	Ven2	Yes	1:15 P	36"x2	.5'	4'	6'	3:2	Yes	Algae	Res	1
V3	Ven3	Yes	1:30 P	30x2	1'	10'	14'	8:5	Yes	Clear	Res	0
V4	Ven4	Yes	2:00 P	42"	.5	8'	10'	2:1	Yes	Clear	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sedimentation, pipe in good repair)

1=Needs moderate cleaning (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2= Impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*H:V = Vertical to rectangular channel

NOTES:



Vein 2 - Devils Lane
Twin 36" corrugated.
V-2



Vein 1 Sagebrush Park
36"
V-1



Vein 3 - Twin 30" - Highland
↑
Mill Ave.
V-3



Vein 4 - 42" concrete
Brookhollow & Fay
V-4

Form O - Outfall Data

Person: Breitmayer Jerome Date: 6/15/05 6/16/05 Time Since Last Rain was ≥ 72 Hours: Yes √

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 6 +7

Municipality: Nether Providence Twp Name of receiving water: Ducks Run

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (military)	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or pollutant present)	Describe land use of upstream drainage area	Rating (0-2)
D1												
D2	D2	YES	7:15 P	24"x8"	0	4'	8'	1:1	NO	N/A	Res	0
D3	D3	Yes	7:30 P	30"x2	.7	8'	8'	2:3	Yes	Clear	Res	0
D4	D4	Yes	7:40 P	18"	0	6'	10	5:5	NO	N/A	Res	0
D5	D5	Yes	7:30 A	18"	0	6'	12'	1:1	NO	N/A	Res	0
D6	D6	Yes	7:45 P	18"	0	3'	4'	2:3	NO	N/A	Res	0
D7	D7	Yes	7:45 A	18"	.1	3'	4'	2:3	Yes	Clear	Res	0
D8	D8	Yes	8:00 A	18"	0	4'	8'	1:1	NO	N/A	Res	0
D9	D9	yes	8:50 A	12"	.2	3'	3'	1:1	Yes	Clear	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment; pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae; pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to Vertical ratio

*1:1 = Vertical - rectangular channel

NOTES.

Form O - Outfall Data

Person: Breitmayer / Jerome Date: 6/16 Time Since Last Rain was ≥ 72 Hours. Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 7

Municipality Nether Providence Twp. Name of receiving water. Dicks Run

Pipe ID #	Photo #	Sheen Exam? Yes/No (Oil sorb.)	Time (hh:mm) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
D10	D10	Yes	9:30 AM	18"	0	6'	16'	4:3	NO	N/A	Res	0
D11	D11	Yes	10:30 AM	18"	0	8'	10'	5:8	NO	N/A	Res	0
D12	D12	yes	10:40 AM	36"	2	6'	17'	1:1	Yes	Clear	Res	0
D13	D13	yes	10:45 AM	10"	0	6'	12'	1:1	NO	N/A	Res	0
D14	D14	yes	11:00 AM	15"	0	10'	12'	3:5	NO	N/A	Res	0
D15	D15	NO	11:05 AM	N/A	N/A	4'	12	3:2	NO	N/A	Res	0
D16	D16	yes	11:15 AM	18"	0	6'	10'	5:6	NO	N/A	Res	0
D17	D17	yes	11:30 AM	18"	0	8'	12	3:4	NO	N/A	Res	0
D18	D18	yes	11:45 AM	12"	0	10'	10'	1:1	NO	N/A	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basin or drain)

H:V = Horizontal to vertical ratio

*(1:1 = Vertical - rectangular channel)

NOTES:



Dogwood @ Plush Mill - Dicks Run D-3



Plush Mill @ Dogwood D 2
2 exit pipes



D 5 - From Green Valley To Concrete Swale to Dicks Run



From Knoll to Dicks Run
D 4 - 18" Concrete



D7 - Possum Hollow to Dicks Run - Train Station



D6 - Possum Hollow To Dicks Run - Train Station



D9 - Avondale @ cricket To Dicks Run



From Knoll @ Turner to Dicks Run. D8



Avondale @ Knoll - to Dicks Run D11



D10 - Sykes Crl DeSac to Dicks Run



Under Avondale Rd @ Knoll to Dicks Run D13



Avondale @ Kershaw to Dicks Run D12



D16 - Coppices @ Avondale Storm Drain Culvert entering Dicks Run



D14 - Culvert Seen of Knoll ed to Dicks Run



D17 - Avondale @ end of concrete sidewalk with Blue Route overhead to Dicks Run



D15 Avondale @ entrance of Leaf Site entering Dicks Run



D18 - Avondale just before intersection of R. Valley Road

Form O - Outfall Data

Person: Breitmayer, Jeron Date: 6/15/05 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain < 0.1 inches: > 0.1 inches Days Since Last Rain 5

Municipality: Nether Providence Twp Name of receiving water: Crum Creek

Pipe Sample #	Photo #	Storm Drain? Yes/No/ Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Dry-weather land use of upstream drainage area	Rating (0-3)
C1	C1	Yes	11:00 AM	24"	0	8'	8'	1:1	No	N/A	Res	0
C2	C2	Yes	11:10 AM	24"	0	8'	8'	1:1	No	N/A	Res	0
C3	C3	Yes	11:28 AM	24"	0	N/A	N/A	N/A	No	N/A	Res	0
C4	C4	Yes	11:40 AM	30"	0	8'	8'	1:1	No	N/A	Res	0
C5	C5	Yes	11:50 AM	48"	-1	6'	6'	1:1	Yes	clear	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (previous dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - Needs investigation (flow exhibiting odors, turbid, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, broken catch basin or manhole)

H:V = Horizontal to Vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:



C7



C4



C4



C3



Forum - Intersection
Semiotic + Poetics
C5

Form O - Outfall Data

Person: Briedmayer Jerome Date: 6/17/05 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 7

Municipality: Wethersfield Twp Name of receiving water: Beaty Run

Post Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (00:00) Military	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if Oil&Gas, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
B1	B1	Yes	7:10A	Direct	to Box Culvert			1:1	NA	Clear	Res	0
B2	B2	Yes	7:15A	12"	0	6	6	1:1	NO	N/A	Res	0
B3	B3	yes	7:30A	Direct	to Box	Culvert	4	1:1	No	N/A	Res	0
B4	B4	Yes	7:40A	18"	0	6	10	5:3	NO	N/A	Res	0
B5	B5	Yes	8:00A	24"	0	8	8	1:1	No	N/A	Res	0
B6	B6	Yes	8:15A	18"	0	8	8	1:1	NO	N/A	Res	0
B7	B7	Yes	8:30A	12"	0	8	8	1:1	no	N/A	Res	0
B8	B8	Yes	8:45A	Direct	to Box	Culvert		1:1	Yes	Clear	Res	0
B9	B9	Yes	9:00A	18"	0	6	12	6:3	NO	N/A	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow retaining odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basin or manhole)

H:V = Horizontal to vertical ratio

T:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Breitmayer Team Date: 6/17/15 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches > 0.1 inches Days Since Last Rain 7

Municipality: Nether Providence Twp - Name of receiving water: Beatty Run

Pipe Outfall #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Design Width (feet)	Channel Side Slopes? (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if treatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
B10	B10	Yes	9:15A	18"	0	10	20	2:1	NO	N/A	Res	0
B11	B11	Yes	9:30A	18"	0	6	12	2:1	NO	N/A	Res	0
B13	B13	Yes	9:40A	18"	0	8	8	1:1	NO	N/A	Res	0
B14	B14	Yes	9:55A	16"	0	8	8	1:1	NO	N/A	Res	0
B15	B15	Yes	10:10A	18"	0	6	12	2:1	NO	N/A	Res	0
B16	B16	Yes	10:15A	18"	0	6	12	2:1	NO	N/A	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=High impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

T/Z = Trapezoidal (or rectangular channel)

NOTES:



Dexter Cove – New Development
12" Pipe to Beatty B2



Taylor Drive - Storm Drain
to Box Culvert Beatty Run
B1



Bowers 12" Pipe

B 4



115 Meadow - Storm Drain Direct
to Box Culvert - Beatty Run
B3



Beatty 6 " Berkshire to Beatty Run.

B6



Looking North - B5 to Beatty

B5



Beatty 8 - Looking East Down at Devon to Beatty Open Storm Box Culvert B8



Beatty 7 - B7

Looking South to Beatty Run



Beatty 10 - Whitefish Circle to Fenway Ave B10



Beatty 9 - 0 from Whitefield Way - 2 Dr B-9



Beatty 12 - 821 Pleasant B12



Beatty 11 - from Pleasant Hill Rd 809 B11



Beatty 14 – 903 Harvey
B14



37 Waterlily Way
Beatty 13 B13



Beatty 16 – 806 Harvey
B16



Beatty 15
805 Harvey B15

Form O - Outfall Data

Person: Breitmayer, Jerome Date: 6/16/05 Time Since Last Rain was ≥ 72 Hours: Yes _ No _
Ellis, John
Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 6

Municipality: Upper Providence Twp Name of receiving water: Beaty Run

Type (Swale, P	Photo #	Stream Dram? Yes/No (Not pure	Time (Military) hr/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or soil tone present)	Describe land use of upstream drainage area.	Rating (0-2)
BT1	BT 1	Yes	7:15	Box Culvert Dried			N/A	A	Yes	Clear	Res	0
BT2	BT 2	Yes	7:30	Box Culvert Dried			N/A	A	Yes	Clear	Res	0
BT3	BT 3	Yes	7:45	24"	.2	8	8	1:1	Yes	Clear	Res	0
BT4	BT 4	Yes	7:50	Box Culvert Dried	6	6	6	1:1	Yes	Clear	Res	0
BT5	BT 5	Yes	7:55	Box Culvert Dried	6	6	6	1:1	Yes	Clear	Res	
BT6	BT 6	Yes	8:00	[illegible] Culvert	6	6	6	1:1	Yes	Clear	Res	0
BT7	BT 7	Yes	8:30	Box Culvert Dried	8	8	8	1:1	Yes	Clear	Res	0
BT8	BT 8	Yes	8:40	Box Culvert Dried	8	12	3:2	Yes	Clear	Res	0
BT9	BT 9	Yes	8:45	18"	Concrete	Swirl	N/A	N/A	N/O	N/A	Res	0

Rating Systems:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (Some dry weather flow, no floats scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (Flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical rectangular channel

NOTES:

Form O - Outfall Data

Person: Ellis John Date: 6/17/05 Time Since Last Rain was ≥ 72 Hours. Yes ✓
Brettmeyer Jeremy
Quantity of Last Rain < 0.1 inches > 0.1 inches Days Since Last Rain 7

Municipality: Nether Providence Twp Name of receiving water: Beatty Run

Pipe Sketch #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
BTib	BT10	Yes	12:20 PM	Box Culvert	0	12	12	1:1	NO	N/A	Res	0
BT11	BT11	Yes	12:10 PM	18"	0	12	12	1:1	NO	N/A	Res	0
BT12	BT12	Yes	12:30 PM	Box Culvert Direct	4	6	3:2	NO	N/A	Res	0
BT13	BT13	Yes	12:30	Box Culvert Direct	4	6	3:2	NO	N/A	Res	0

Rating System:
0=No observed impairment (no dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)
1=Needs restocking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)
2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)
H:V = Horizontal to vertical ratio
1:1 = Vertical - rectangular channel
NOTES:



300 Eastfield

BT2



216 Laurel Lane
Direct to Box Culvert

BT1



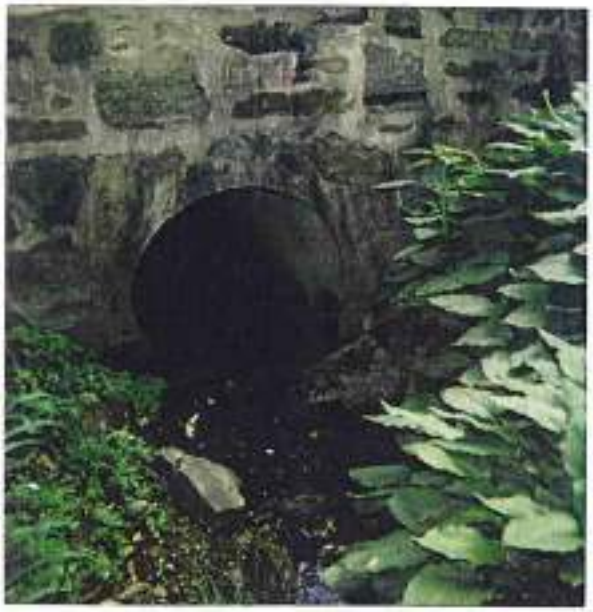
405 Scott Lane

BT4



Side yard of 300 Fairfield

BT3 24"



406 Scott Lane

Bt 6

Pt6



Pt5 404 Scott Lane



Bt ~~12~~ 8 Georgetown @ sheffield



407 Christian Lane Side yard

~~Bt 5~~

BT 7



BT 10 532 & Georgtown
To Box culvert



BT 9 Goy Creek side of House



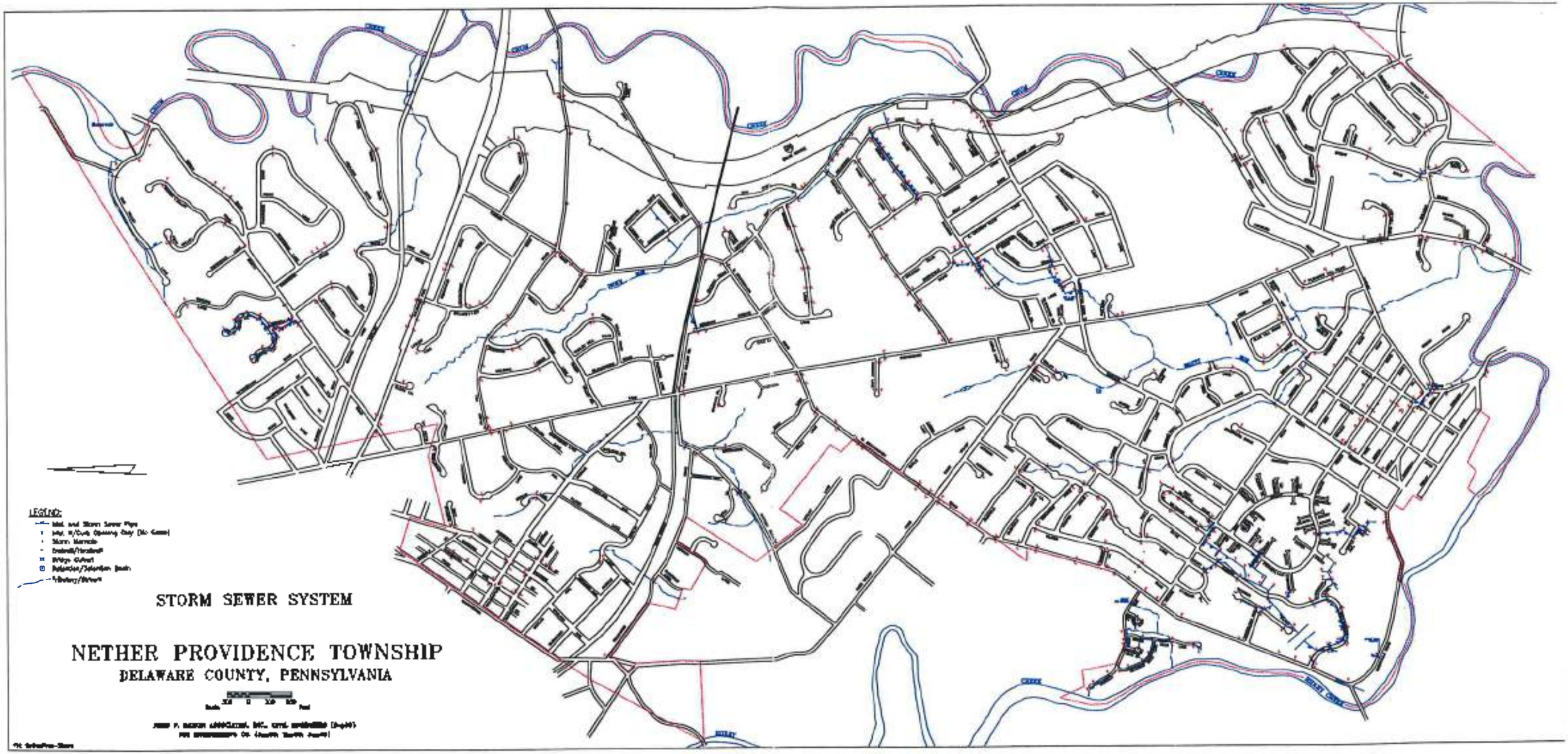
BT 10 719 Oxford
Direct to Box culvert



BT 11 Georgtown 532



B+ 13 Down Anchorage
Road to Box Canyon



Attachment III

NEWTOWN TOWNSHIP

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: Newtown Township

Contact Person: Maria Toglia & Linda Bauer

WPAC Designee: _____

Title: Co Chairs of EAC

Address: Maria Toglia: 4115 Meadow Lane
Newtown Square, PA 19073

Phone: Maria Toglia: 610 325-7820

Fax: " (610) 325-4304

Person Completing form (if different from Contact Person).

Name: _____

Address: _____

_____

Phone: _____

Fax: _____

E-mail: _____

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance		
Subdivision/Land Development Ordinance		
Separate Stormwater Ordinance	In process	
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors				
Municipal Engineering Department			✓	
Municipal Planning Department				
County Planning Department	✓			
County Conservation District	✓			
Zoning Hearing Board			Supervisors	Supervisors
Consulting Engineer				
Others (List Below				

landscape engineer ✓

C. Please provide **copies** of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

Zoning, [illegible] ordinance, zoning map

Storm water management ordinance is in progress

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	✓		
Comprehensive Land Use Plan	✓		
Existing Land Use Maps	✓		
Proposed Land Use Maps			
Zoning Maps	✓		

approval dates are unknown at this time.

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	?
Participates in FEMA Regular Program	?

Wantagh Township Engineer
Township does know

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

STORM WATER PROBLEM AREAS - FORM A sheet 1 of 1

WATERSHED Name: Crum Creek Municipality Newtown County Delaware

FORM COMPLETED BY Name: [illegible] Telephone: [illegible] Date: 9-4-04

Letters correspond to Map Labled Stormwater Basins & Water flow Concern Areas (Info also available on GIS) Consider watershed

MAP NO.	sample A-99	A-	B 1/2	C	D	E	G	A-I	A-J	A-	A-	A-	A-
Types of Storm Water Problems													
Flooding	x	X	X	X	X	X	X	X	X				
Accelerated Erosion	x		X	X									
Sedimentation													
Landslide													
Groundwater													
Water Pollution	x												
Other (Explain)													
Explanation Line No (s)				1			7	9	10				
Cause(s)													
Storm Water Volume	x	X	X	X	X	X	X	X	X				
Storm Water Velocity	x		X	X				X					
Storm Water Direction	x			X				X					
Water Obstruction	x					X	X		X				
Other (Explain)													
Explanation Line No (s)					3	5	7		11				
Frequency													
Year Most Recent Occurred		2004 ?	2004 ?	2004 ?	2004 ?	2004 ?	2004 ?	? ?	? ?				
Year First Known to Occur													
Regularity													
More Than 1/Year	x	✓		✓	✓	✓	✓	?	?				
Less Than 1/Year													
Only During Agnes or Floyd													
Duration (If Applicable)													
Less Than One Day	x					✓		?	?				
One Day + (Enter Days)		✓	✓	✓	✓		✓						
Property Damages													
Loss of Life (Vital Services)					X	X							
Private		X	X	X	X		X	X	X				
More Than One Owner		X	X	X			X						
Types of Properties													
Undeveloped													
Agricultural													
Residential		X	X	X	X	✓	X		X				
Commercial	x							X					
Industrial													
Number of Properties													
1					X	X		X					
2-10	x	✓	✓	✓					X				
11+							X						
Public (List Types)													
Explanation Line No (s)					4	6							
Solutions													
Suggested													
Explanation Line No (s)	1			2									
Formally Proposed							X						
Explanation Line No (s)							8						

EXPLANATION LINES

1 Uncontrolled run off from Nolan property onto 3 Echo Valley Properties
2 Township, Brandywine Conservancy & Township considering options with Nolan
3 Crum Creek overflows onto Street & property across Street
4 Bartram Bridge property - Road closes
5 Water flow obstructed by Gosben Rd.
6 Public Rd. - closes when flooded
7 Standing water creates mold problem, impervious surfaces impede infiltration

FOUR

Newtown (NEW)

FORM B OBSTRUCTION DATA COLLECTION SHEET 2 OF 15

Municipal Stream Obstruction Data

Records completed by _____

Watershed: Upper Crum Creek

Final walk personnel: _____

Municipality/County: Newtown / Delaware Co. Date(s): 12/1 - 12/20/04

OBS ID	Owner or Address Of Obstruction	Capacity (CFS)	Note (#)	Opening Type: Part of Bridge?	Opening Type: Culvert Perfect	Opening Shape (✓): Culvert ○	Culvert □	Culvert ▯	Culvert ○	Bridge ⌒	Bridge ⊓	Measurements: L (ft)	S (%)	H (ft)	W (ft)	PW (ft)	Other code	MATERIAL / INLET CONDITION	NOTES
NEW1	Three Farm Rd Footbridge						✓					4.6	1.5	–	–	–	90	CMP / Good Rd	
NEW2	Scott Rd N Footbridge		1				✓					4	2	–	–	–	90		Lewis Run
NEW3	Tree						✓					4.1	6	–	–	–	90		
NEW4	Crum Ck Rd		1	✓						✓		3.1	–	1.6	15.5	–	90	Corrug / Wing	
NEW5				✓						✓		3.1	–	4	12	–	90	S / None	
NEW6	Footbridge						✓					4.1	2.5	–	–	–	90		
NEW7	Footbridge							✓				4.1	–	5.6	8	–	90	RCP / Wing	
NEW8	Footbridge							✓				2.2	–	4.5	8	–	90	RCP / Wing	
NEW9	Footbridge							✓				2.3	2	–	–	–	90	RCP / Wing	
NEW10				✓						✓		2.8	–	2	6	–	90	CMP	Not certain whether this is a stream
NEW11	321 Friendship Ln						✓					3	1.5	–	–	–	90	CMP	
NEW12	Footbridge						✓					3.1	3	–	–	–	90	CMP / Wing	
NEW13	Footbridge						✓					3.1	3	–	–	–	90	RCP / Wing	
NEW14	Footbridge						✓					3.2	3	–	–	–	90	RCP / Wing	
NEW15	Footbridge						✓					3.2	3	–	–	–	90	RCP / Wing	
NEW16	Footbridge						✓					3	3.3	–	–	–	90	RCP / Wing	
NEW17	Footbridge						✓					4.6	2.5	–	–	–	90	RCP / Wing	
NEW18	Footbridge						✓					4.6	2.5	–	–	–	90	RCP / Wing	
NEW19	Footbridge						✓					4.5	1.5	–	–	–	90	RCP / Wing	
NEW20	Footbridge		2				✓					4.6	2.5	–	–	–	90	RCP / Wing	See Note 2
NEW21	Footbridge						✓					4.7	2.5	–	–	–	90	CMP / Wing	
NEW22	Footbridge						✓					4	2.5	–	–	–	90	RCP / Wing	
NEW23	Footbridge			✓						✓		4	–	7	12.5	–	90		
NEW24	Footbridge						✓					4.5	2.5	–	–	–	90	RCP / Wing	
NEW25	Footbridge						✓					4.5	4	–	–	–	90	RCP / Wing	
NEW26	Footbridge						✓					4.5	4	–	–	–	90	CMP	
NEW27	Footbridge						✓					5	3	–	–	–	90	RCP / Wing	
NEW28	Footbridge							✓				5	2	5	14	–	90	CMP / Wing	
NEW29	Footbridge			✓						✓		3.5	–	3.0	22	–	90	Corrug / Wing	2 RR Rail Road
NEW30	Mercerville			✓						✓		3.5	–	1.8	45	–	90	Corrug / Wing	

*Relabeled NEW34-NEW44 to NEW27-NEW37

NEWtown (NEW)

FORM B - OBSTRUCTION DATA COLLECTION SHEET 15 OF 15

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Newtown / Delaware

Records completed by: [illegible]

Field work personnel: _____

Date(s): 12/1 - 12/20

T = amount of fill
Do = Diameter
HT = Height
W = Width
PW = Pier Width

Materials
masy = Stone Masonry Structure
CMP = Corrugated Metal Pipe
CPP = Corrugated Polyethylene Pipe
SCCMP = Sturmtrux Coated CMP
RCP = Reinforced Concrete Pipe
SP = Steel Pipe

Inlet conditions
HW = Headwall
WW = Wingwall
SW = Sidewall

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Bridge ∩	Bridge ⊓	T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
NEW 1	RT 252 / Underpass		1					X			12		2.6	9	-	90	CMP / HW / SW	
NEW 2	[illegible]		1				X				1.9	7.8		3	-	90	[illegible]	Stone masonry arch
NEW 3	RT 252 / Underpass		1				X				3	3		5	-	90	CMP / HW	
NEW 4	Trail Entrance / Underpass		1			✓					4.5	2	5	3.5	-	90	[illegible]	
NEW 5	Trail Entrance / Underpass		1	✓					✓		4	2	6	3.5	-	90	[illegible]	
NEW 6	[illegible]		1				✓				4.5	1.5	4.5	5	-	90	[illegible]	
NEW 7	[illegible]		1	✓					✓		1	-	4.5	5	-	90	[illegible]	
NEW 8	Sunrise Assisted Living		1				✓				8	1	-			90	[illegible]	

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: Cum Creek	Name: Ted Beaver	Channel Excavation / Widening	Levee	Dams
Municipality: Peebles	Telephone: 740 256 1900	Channel Realignment	Gabions	Floodwall
County: Pike Twp.	Date: 6-2-04	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C- 1	Culvert	03	?			Goble
C- 2	Culvert	03	?			Bridge Owner
C- 3	Pipe Crossing Riparian	01	?			
C-	Picked dam pit repair		?			Non-municipal Temporary unauthorized — not planned or approved act
C-						

Page 1

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET 1 OF 1

WATERSHED	FORM COMPLETED SY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: Crow Creek	Name: [illegible]	Channel Excavation / Widening	Levee	Dams
Municipality: Newtown	Telephone: 610-356-[illegible]	Channel Realignment	Gabions	Floodwall
County: Delaware	Date: 8-30-04	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complt'n. Date	Expected Life Yrs	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C F.S.		
		Prelim.	Final								
D-1	Discharge System into wetlands or	✓			05	05	?			D1	Newtown Heights
D-	approved area [illegible]							waiting to get info from [illegible]			
D-											
D-											
D-											

(H)

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

We have not identified water quality problem areas in our Township

WATER QUALITY PROBLEM AREAS (FORM J)

Watershed
Name: Crum Creek
Municipality: Newtown Township
County: Delaware

Form Completed By
Name: Maria Tiglia
Telephone: 610.325 9820
Date: 9.15.04

Site:	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems								
High Community Tolerance								
High Temperature								
High Turbidity								
Hydrocarbon Pollution								
Low Community Diversity								
Low Dissolved Oxygen								
Low pH								
Nutrient Enrichment								
Poor Habitat								
Other / Explanation Line No.								
Potential Causes(s)								
Agriculture								
Construction Site								
Erosion								
Lake Discharge								
STP Outfall								
Other / Explanation Line No.								
Frequency								
Year Most Recent Occurrence								
Year First Known Occurrence								
Source of Information								
Streamwatch								
County Water Quality Study								
Driveby								
DEP Complaint Investigation								
Other / Explanation Line No.								

Explanation Lines
1. _____
2. _____
3. _____

Newtown Boundary
Municipal Boundaries
Parcel Boundaries
Contours (20 Foot Intervall.)
Waterways
Stream walk points

Waterway Concern Areas

A - Flooding in heavy rain
B1 / B2 - Flooding in heavy rain / wet ground
C - Uncontrolled runoff into Echo ~~Ganyon~~ Valley

Waterflow Concern Points

D - New culvert to control street flooding on Boot & Goshen Rds.
E - New culvert to control street flooding on Goshen
F - Rip rap stormdrain system
G - Flooding washout
H - New recharge system in wetlands
I - Runoff over berm
J - Runoff into condos from parking lot

Basins (Identified & Potential)

0 - Requires Field Verification
1 - Bakers Lane
2 - Behind Pulte
4 - Harrison Track
5 - Basin behind Post Office
6 - Basin behind Post Office
7 - SAP Basin
8 - Nolan Property
9 - Nolan Property
10 - Franklin Farms - Roll International
11 - Sunny's Way
12 - New Development
13 - DeBotton
14 - Hunt Valley Circle
15 - Off Campus Blvd.
17 - Malin & Bryn Mawr

Feet
0
3,000
6,000

Newtown Township
Delaware County, Pennsylvania

Stormwater Basins & Waterflow Concern Areas

RIDLEY PARK BOROUGH

Turning Ideas Into Reality

CATANIA ENGINEERING ASSOCIATES, INC.

Consulting Engineers & Land Surveyors

November 16, 2005
File No. 83600-115-8

Justin D. Kauffman
Environmental Planner
Delaware County Planning Department
Court House & Government Center Building
201 West Front Street
Media, PA 19063

Re: Borough of Ridley Park
Crum Creek Act 167 Plan

Dear Mr. Kauffman:

Enclosed please find forms A through J completed for the Crum Creek Watershed portion of Ridley Park Borough.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

Jamie H. Bricker. EIT
for Catania Engineering Assoc., Inc.

JHB/sjm
Enclosures
cc: Robert Poole

520 W. MacDade Boulevard, Milmont Park, Pennsylvania 19033-3311
Phone: (610) 532-2884 Fax: (610) 532-2923 E-Mail: CEAINC1@aol.com

DELAWARE COUNTY PLANNING DEPARTMENT

DCPD

Court House/ Government Center , 201 W. Front St., Media, PA 19063
Office Location: Toal Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning_department@co.delaware.pa.us

BORTON LAWSON LEHIGH VALLEY OFFICE
GRB
PAD
MJW
WSB
PAR
ADMIN
NOV 3 0 2005
☐ CORRESPONDENCE
☐ AGREEMENT
☐ CONTRACT
PROJECT NO.

TO: Bill Brokaw

FROM: Christopher Gallagher

DATE: 11/1/05

RE: Crum Creek Stormwater Management Plan
Ridley Park Borough Forms

Bill,

Please find attached Forms A through J for Ridley Park Borough.

If you require any additional information, please do not hesitate to contact me at (610)-891-5130.

FORM A - STORM WATER PROBLEM AREAS SHEET 1 OF 2

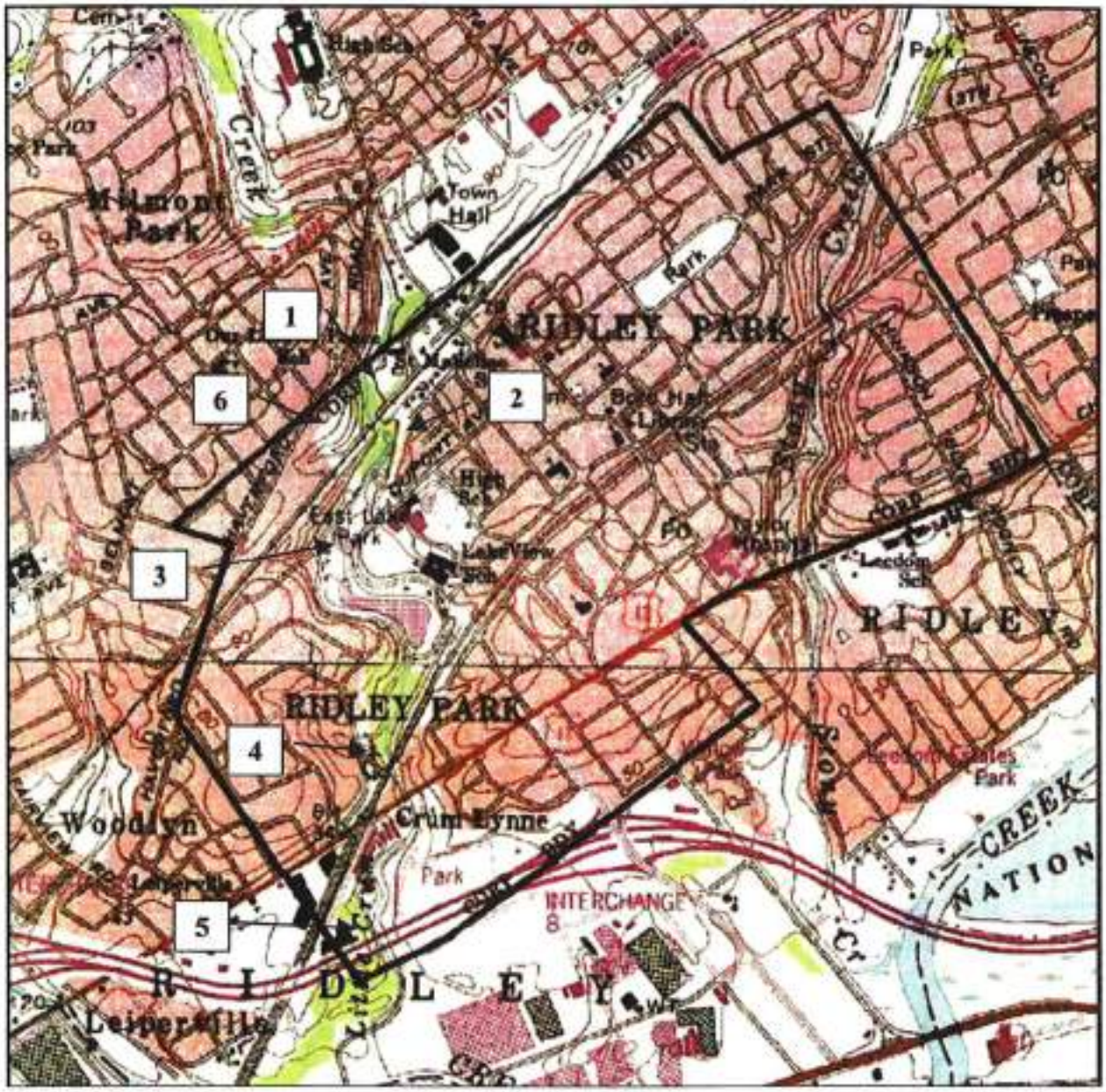
WATERSHED		FORM COMPLETED BY		Before Filling Out Form, See Instructions on Back
Name:	Crum Creek	Name:	Jamie H Brickar	
Municipality	Ridley Park Borough	Telephone:	610-532-2884	For County Use:
County:	Delaware	Date:	11/15/2005	

MAP NO *	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12
Types of Storm Water Problems												
Flooding	X					X						
Accelerated Erosion	X	X		X	X							
Sedimentation			X									
Landslide												
Groundwater												
Water Pollution			X									
Other (Explain)						X						
Explanation Line No. (On Back)	1	2	3	4	5	6	7	8	9	10	11	12
Cause (s)												
Storm Water Volume	X	X		X	X	X						
Storm Water Velocity	X	X	X	X	X							
Storm Water Direction												
Water Obstruction	X											
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	2005	2005	2005	2005	2005	2005						
Year First Known Occurred	?	?	?	?	?	?						
Regularity												
More Than 1 Year	X	X	X	X	X	X						
Less Than 1 Year												
Only During Apnes												
Duration (If Applicable)												
Less Than 1 Day												
1 Day + (Enter Days)	1	1		1		1						
Property Damage												
Loss of Life/Vital Services												
Private	X	X		X	X	X						
More Than One Owner	X			X								
Types of Properties	R	R		R		R						
Number of Properties		1				1						
Public (List Types)			Rec									
Explanation Line No. (On Back)												
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed												
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities

	FORM A - STORM WATER PROBLEM AREAS SHEET 2 OF 2
	EXPLANATION LINES
1	accelerated erosion and periodic flooding at Swim Club upstream of CSX RR culvert
2	accelerated erosion at end of East Rodgers Street
3	sedimentation in sediment basin above East Lake Park
4	accelerated erosion upstream of RR bridge
5	accelerated erosion upstream of I-95
6	flooding public safety issues
7	
8	
9	
10	
11	
12	

RIDLEY PARK BOROUGH



Ridley Park

FORM B - OBSTRUCTION DATA COLLECTION SHEET 2 OF 15

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Ridley Park / Delaware

Records completed by: Brian Bruno

Field work personnel: " "

Date(s): 12/1 - 12/20/04

Material: masy = Stone Masonry Structure; CMP = Corrugated Metal Pipe; CPP = Corrugated Polyethylene Pipe; SCCMP = Bituminous Coated CMP; RCP = Reinforced Concrete Pipe; SP = Steel Pipe

Inlet Conditions: HW = Headwall; WW = Wingwall; SW = Sidewall

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Bridge ⌒	Bridge ⊓	Measurements: T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
RP-1	Ridley Pk. pond									✓	10.5		13.5	73		90°	(concrete)	

L:\GIS\Data\Misc-stormwater\Act167DOCS\DataCollectionForms\obsforms.xls

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Jamie H. Bricker	Channel Excavation / Widening	Levee	Dams
Municipality:	Ridley Park Borough	Telephone:	610-532-2884	Channel Realignment	Gabions	Floodwall
County:	Delaware	Date:	11/15/2005	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C-1	East Lake Park Dam rehab	1960 (?) 1994	100	N/A	N/A	Robert Poole (610) 532-2100 105 E. Ward Street, Ridley Park, PA 19078
C-2	East Lake Park Lake Bank Stabilization (rip rap)	1999	10	N/A	N/A	Robert Poole (610) 532-2100 105 E. Ward Street, Ridley Park, PA 19078
C-3	East Lake Park Debris & Sediment Removal	1999 2003 2004	5	N/A	N/A	Robert Poole (610) 532-2100 105 E Ward Street, Ridley Park, PA 19078
C-4	Hillside Road Bank Stabilization & Channel Deflectors	2000	10	N/A	N/A	Robert Poole (610) 532-2100 105 E. Ward Street, Ridley Park, PA 19078
C-						

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Jamie H. Bricker	Channel Excavation / Widening	Levee	Dams
Municipality:	Ridley Park Borough	Telephone:	610-532-2884	Channel Realignment	Gabions	Floodwall
County:	Delaware	Date	11/15/2005	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complt'n Date	Expected Life Yrs	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S		
		Prelim.	Final								
D-1	East Lake Park Debris & Sediment Removal		X		2005	N/A				3	Robert Poole (610) 532-2100 105 E. Ward Street, Ridley Park, PA 19078
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Crum Creek Municipality: Ridley Township County: Delaware	Name: Jamie H. Bricker Telephone: 610-532-2884 Date: 8/17/2004	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-1	Rudgers Street Storage Structure	1995	Robert Poole (610) 532-2100 105 E. Ward Street, Ridley Park, PA 19078	72" CMP underground storage pipes
E-2	Kings Court Retention Basin	?	Homeowners Association	
E-				
E-				
F-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED STORM WATER CONTROL FACILITIES FORM F. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Jamie H. Bricker
Municipality:	Ridley Park Borough	Telephone:	610-532-2884
County:	Delaware	Date:	11/15/2005

DEFINITION

Storm Water Control Facility
A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use.

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Date		Map No. Form A*	Contact Person Name, Address and Phone	Comments
		Start	End			
F-	There are NO proposed stormwater control facilities within the Borough of Ridley Park					
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the stormwater problem area's Map ID No , if the proposed project will solve or reduce and / all of an identified drainage problem

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 1 OF 13

WATERSHED
Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 11/15/2005

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1	G-2	X			24"				HDPE	2001	Y	Robert Poole 610-532-2100	Ridley Park Borough
G-2	G-3	X			24"				HDPE	2001	Y	Robert Poole 610-532-2101	Ridley Park Borough
G-3	G-4	X			24"				HDPE	2001	Y	Robert Poole 610-532-2102	Ridley Park Borough
G-4	G-5	X			18"				HDPE	2001	Y	Robert Poole 610-532-2103	Ridley Park Borough
G-4	G-6	X			18"				HDPE	2001	Y	Robert Poole 610-532-2104	Ridley Park Borough
G-26	G-27	X			?								Penn Dot
G-47	G-48	X			?						N	Robert Poole 610-532-2104	Ridley Park Borough
G-48	G-49	X			?						N	Robert Poole 610-532-2105	Ridley Park Borough
G-48	G-50	X			?						N	Robert Poole 610-532-2106	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 2 OF 13

WATERSHED
Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 11/15/2005

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-70	G-71	X									N	Robert Poole 610-532-2100	Ridley Park Borough
G-71	G-72	X									N	Robert Poole 610-532-2101	Ridley Park Borough
G-72	G-73	X									N	Robert Poole 610-532-2102	Ridley Park Borough
G-73	G-74	X									N	Robert Poole 610-532-2103	Ridley Park Borough
G-74	G-75	X									N	Robert Poole 610-532-2104	Ridley Park Borough
G-75	G-76	X									N	Robert Poole 610-532-2105	Ridley Park Borough
G-75	G-77	X									N	Robert Poole 610-532-2106	Ridley Park Borough
G-75	G-78	X									N	Robert Poole 610-532-2107	Ridley Park Borough
G-78	G-79	X									N	Robert Poole 610-532-2108	Ridley Park Borough
G-79	G-80	X									N	Robert Poole 610-532-2109	Ridley Park Borough
G-78	G-81	X									N	Robert Poole 610-532-2110	Ridley Park Borough
G-81	G-82	X									N	Robert Poole 610-532-2111	Ridley Park Borough

FORM G (3)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 3 OF 13

WATERSHED

Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2684
Date: 11/15/2005

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-102	G-103	X			24"						N	Robert Poole 610-532-2100	Ridley Park Borough
G-103	G-104	X			18"						N	Robert Poole 610-532-2101	Ridley Park Borough
G-103	G-105	X			24"				RCP		N	Robert Poole 610-532-2102	Ridley Park Borough
G-105	G-106	X			15"						N	Robert Poole 610-532-2103	Ridley Park Borough
G-105	G-107				24"				RCP		N	Robert Poole 610-532-2104	Ridley Park Borough
G-107	G-108	X			12"						N	Robert Poole 610-532-2105	Ridley Park Borough
G-107	G-109	X			24"				RCP		N	Robert Poole 610-532-2106	Ridley Park Borough
G-109	G-110	X			24"						N	Robert Poole 610-532-2107	Ridley Park Borough
G-110	G-111	X			12"						N	Robert Poole 610-532-2108	Ridley Park Borough
G-110	G-112	X			24"						N	Robert Poole 610-532-2109	Ridley Park Borough
G-112	G-113	X									N	Robert Poole 610-532-2110	Ridley Park Borough
G-113	G-114	X									N	Robert Poole 610-532-2111	Ridley Park Borough
G-114	G-115	X									N	Robert Poole 610-532-2112	Ridley Park Borough

FORM G (3)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 4 OF 13

WATERSHED		FORM COMPLETED BY		INSTRUCTIONS
Name:	Crum Creek	Name:	Jamie H. Bricker	Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.
Municipality:	Ridley Park Borough	Telephone:	610-532-2834	
County:	Delaware	Date:	11/15/2005	

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-113	G-116	X									N	Robert Poole 610-532-2112	Ridley Park Borough
G-116	G-117	X									N	Robert Poole 610-532-2113	Ridley Park Borough
G-117	G-118	X									N	Robert Poole 610-532-2114	Ridley Park Borough

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 5 OF 13

WATERSHED		FORM COMPLETED BY		INSTRUCTIONS
Name:	Crum Creek	Name:	Jamie H Bricker	Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse
Municipality:	Ridley Park Borough	Telephone:	610-532-2884	
County:	Delaware	Date:	11/15/2005	

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-138	G-139	X			18"						N	Robert Poole 610-532-2112	Ridley Park Borough
G-139	G-140	X									N	Robert Poole 610-532-2113	Ridley Park Borough
G-140	G-141	X									N	Robert Poole 610-532-2114	Ridley Park Borough
G-141	G-142	X									N	Robert Poole 610-532-2115	Ridley Park Borough
G-162	G-163	X			18"						N	Robert Poole 610-532-2112	Ridley Park Borough
G-163	G-164	X									N	Robert Poole 610-532-2113	Ridley Park Borough
G-184	G-185	X			18"						N	Robert Poole 610-532-2112	Ridley Park Borough
G-185	G-186	X			18"						N	Robert Poole 610-532-2113	Ridley Park Borough
G-186	G-187	X									N	Robert Poole 610-532-2114	Ridley Park Borough
G-187	G-188	X									N	Robert Poole 610-532-2115	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 6 OF 13

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	T/W	B	Depth					
G-208	G-209	X									N	Robert Poole 610-532-2115	Ridley Park Borough
G-229	G-230	X			18"						N	Robert Poole 610-532-2115	Ridley Park Borough
G-230	G-231	X			18"						N	Robert Poole 610-532-2116	Ridley Park Borough
G-230	G-232	X									N	Robert Poole 610-532-2117	Ridley Park Borough
G-232	G-233	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-253	G-254	X			18" (x2)						N	Robert Poole 610-532-2115	Ridley Park Borough
G-254	G-255	X									N	Robert Poole 610-532-2116	Ridley Park Borough
G-255	G-256	X									N	Robert Poole 610-532-2117	Ridley Park Borough
G-256	G-257	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-277	G-278	X			18"						N	Robert Poole 610-532-2118	Ridley Park Borough
G-278	G-279	X									N	Robert Poole 610-532-2119	Ridley Park Borough

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 7 OF 13

Map ID No.		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	R	Depth					
G-299	G-300	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-300	G-301	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-301	G-302	X									N	Robert Poole 610-532-2120	Ridley Park Borough
G-302	G-303	X									N	Robert Poole 610-532-2121	Ridley Park Borough
G-323	G-324	X			22"						N	Robert Poole 610-532-2118	Ridley Park Borough
G-324	G-325	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-325	G-326	X									N	Robert Poole 610-532-2120	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 8 OF 13

WATERSHED

Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2664
Date: 11/15/2005

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1 G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-346	G-347	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-347	G-348	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-368	G-369	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-369	G-370	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-390	G-391	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-391	G-392	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-392	G-393	X									N	Robert Poole 610-532-2120	Ridley Park Borough
G-391	G-394	X									N	Robert Poole 610-532-2121	Ridley Park Borough
G-394	G-395	X									N	Robert Poole 610-532-2122	Ridley Park Borough
G-395	G-396	X									N	Robert Poole 610-532-2123	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 9 OF 13

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-416	G-417	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-417	G-418	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-438	G-439	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-459	G-460	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-460	G-461		X								N	Robert Poole 610-532-2119	Ridley Park Borough
G-461	G-462	X									N	Robert Poole 610-532-2120	Ridley Park Borough
G-462	G-463		X								N	Robert Poole 610-532-2121	Ridley Park Borough
G-463	G-464	X									N	Robert Poole 610-532-2122	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 10 OF 13

WATERSHED

Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Brickur
Telephone: 610-532-2884
Date: 11/15/2005

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-484	G-485	X			24"				CPP		Y	Robert Poole 610-532-2118	Ridley Park Borough
G-485	G-486	X			24"				CPP		Y	Robert Poole 610-532-2119	Ridley Park Borough
G-486	G-487	X			36"				CPP		Y	Robert Poole 610-532-2120	Ridley Park Borough
G-487	G-488	X			36"				CPP		Y	Robert Poole 610-532-2121	Ridley Park Borough
G-488	G-489	X							CPP		Y	Robert Poole 610-532-2122	Ridley Park Borough
G-488	G-490	X			30"				CPP		Y	Robert Poole 610-532-2123	Ridley Park Borough
G-490	G-491	X			-				CPP		Y	Robert Poole 610-532-2124	Ridley Park Borough
G-491	G-492	X			24"				CPP		Y	Robert Poole 610-532-2125	Ridley Park Borough
G-492	G-493	X			18"				CPP		Y	Robert Poole 610-532-2126	Ridley Park Borough
G-493	G-494	X			15"				CPP		Y	Robert Poole 610-532-2127	Ridley Park Borough
G-493	G-495	X			15"				CPP		Y	Robert Poole 610-532-2128	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 11 OF 13

WATERSHED
Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 11/15/2005

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of First Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-515	G-516	X			15"						N	Robert Poole 610-532-2118	Ridley Park Borough
G-516	G-517	X			15"						N	Robert Poole 610-532-2119	Ridley Park Borough
G-517	G-518	X			15"						N	Robert Poole 610-532-2120	Ridley Park Borough
G-538	G-539	X			15"						N	Robert Poole 610-532-2118	Ridley Park Borough
G-539	G-540	X			15"						N	Robert Poole 610-532-2119	Ridley Park Borough
G-560	G-561	X			30 x 24						N		CSX Railroad
G-561	G-562		X									Robert Poole 610-532-2118	Ridley Park Borough
G-562	G-564	X			18"						Y	Robert Poole 610-532-2119	Ridley Park Borough
G-564	G-563	X			72"						Y	Robert Poole 610-532-2120	Ridley Park Borough
G-564	G-565	X			72"						Y	Robert Poole 610-532-2121	Ridley Park Borough
G-565	G-566	X			24"						Y	Robert Poole 610-532-2122	Ridley Park Borough

FORM G (7)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 12 OF 13

Map ID No		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-566	G-567	X			24"						N	Robert Poole 610-532-2118	Ridley Park Borough
G-567	G-568	X			15"						N	Robert Poole 610-532-2119	Ridley Park Borough
G-568	G-569	X			15"						N	Robert Poole 610-532-2120	Ridley Park Borough
G-567	G-570	X			24"						N	Robert Poole 610-532-2121	Ridley Park Borough
G-570	G-571	X			18"						N	Robert Poole 610-532-2122	Ridley Park Borough
G-571	G-572	X			18"						N	Robert Poole 610-532-2123	Ridley Park Borough
G-572	G-573	X			15"						N	Robert Poole 610-532-2124	Ridley Park Borough

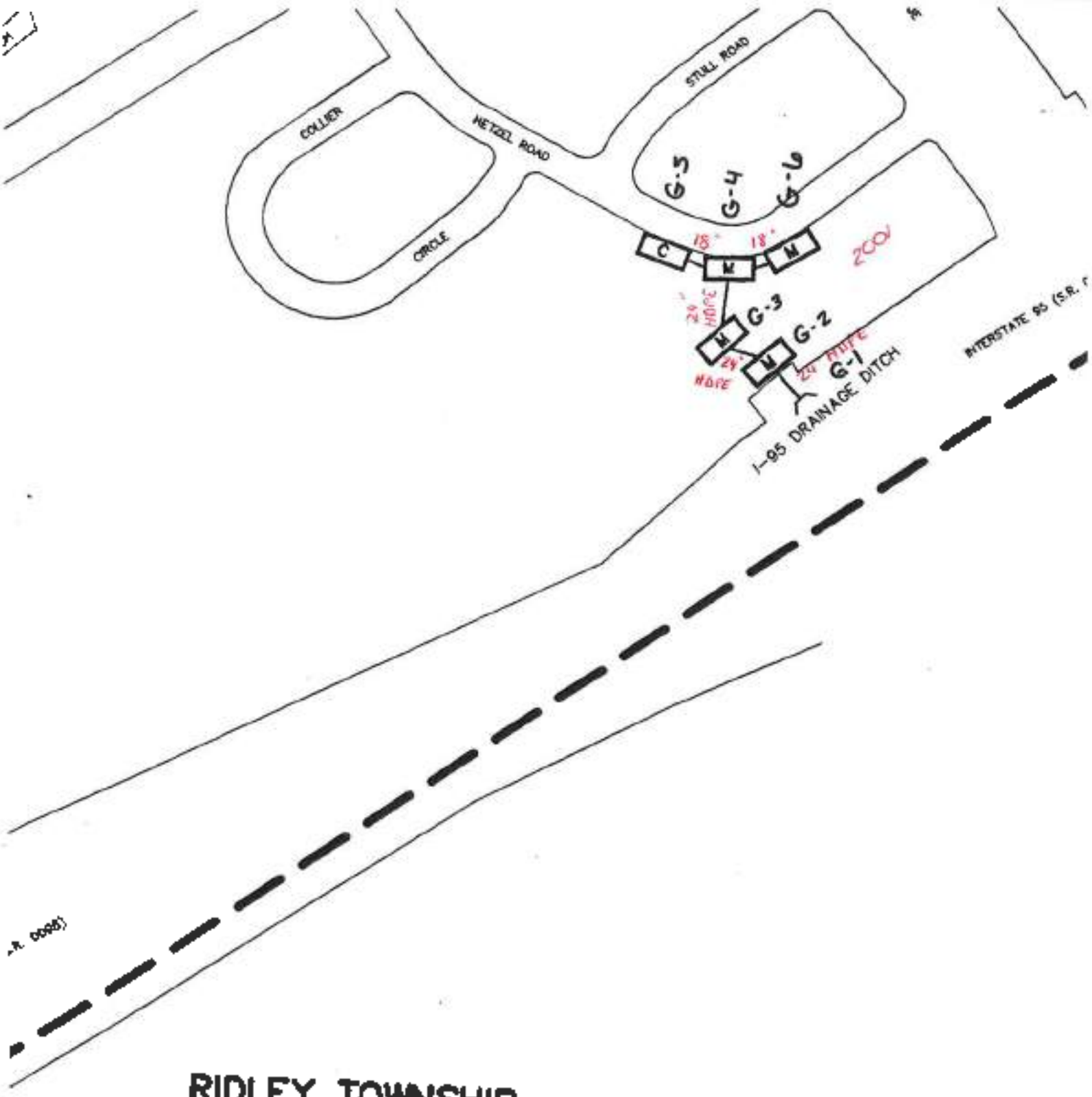
EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 13 OF 13

WATERSHED
Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

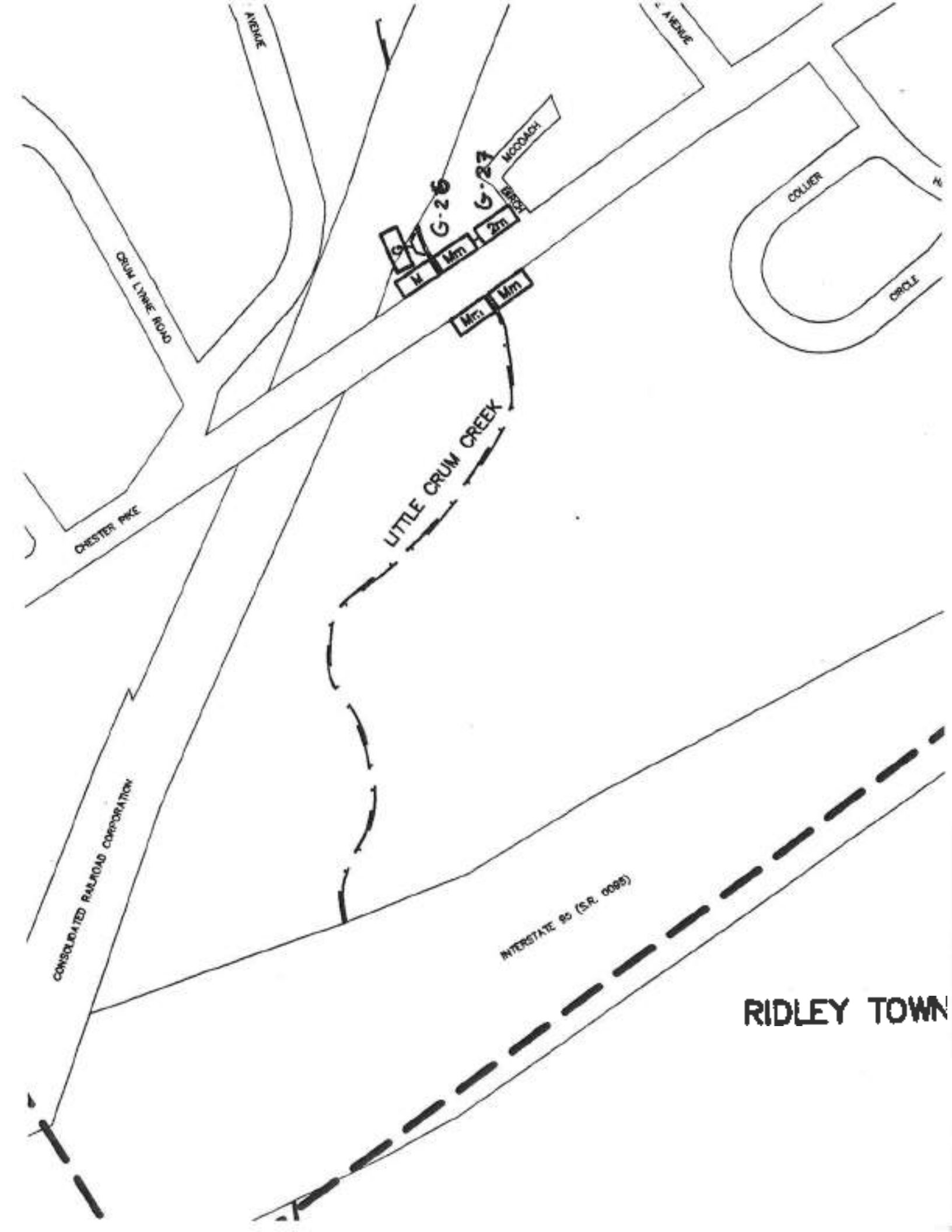
FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 11/15/2005

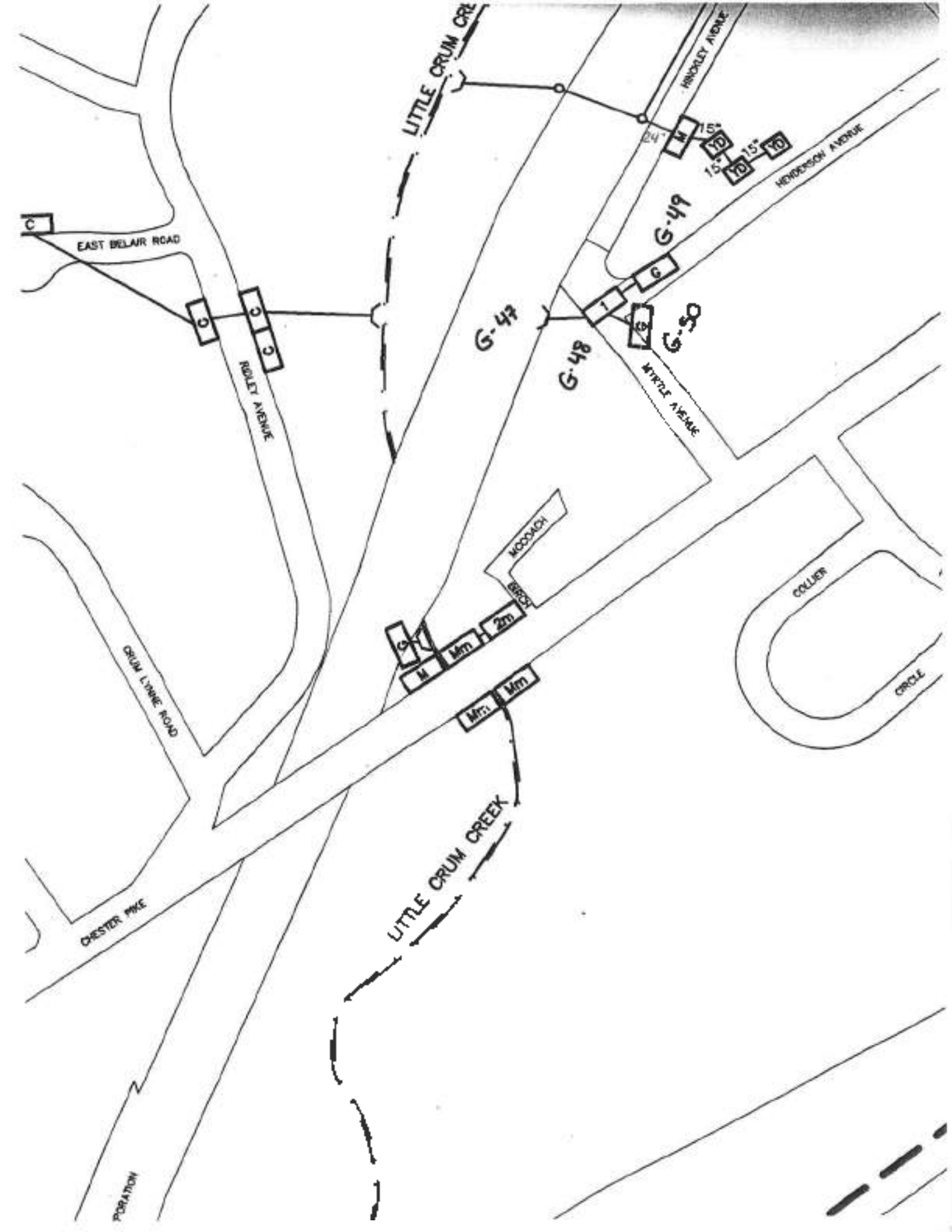
INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3) Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system so G-23 begins the next See Sample Diagrams & Form on Reverse.

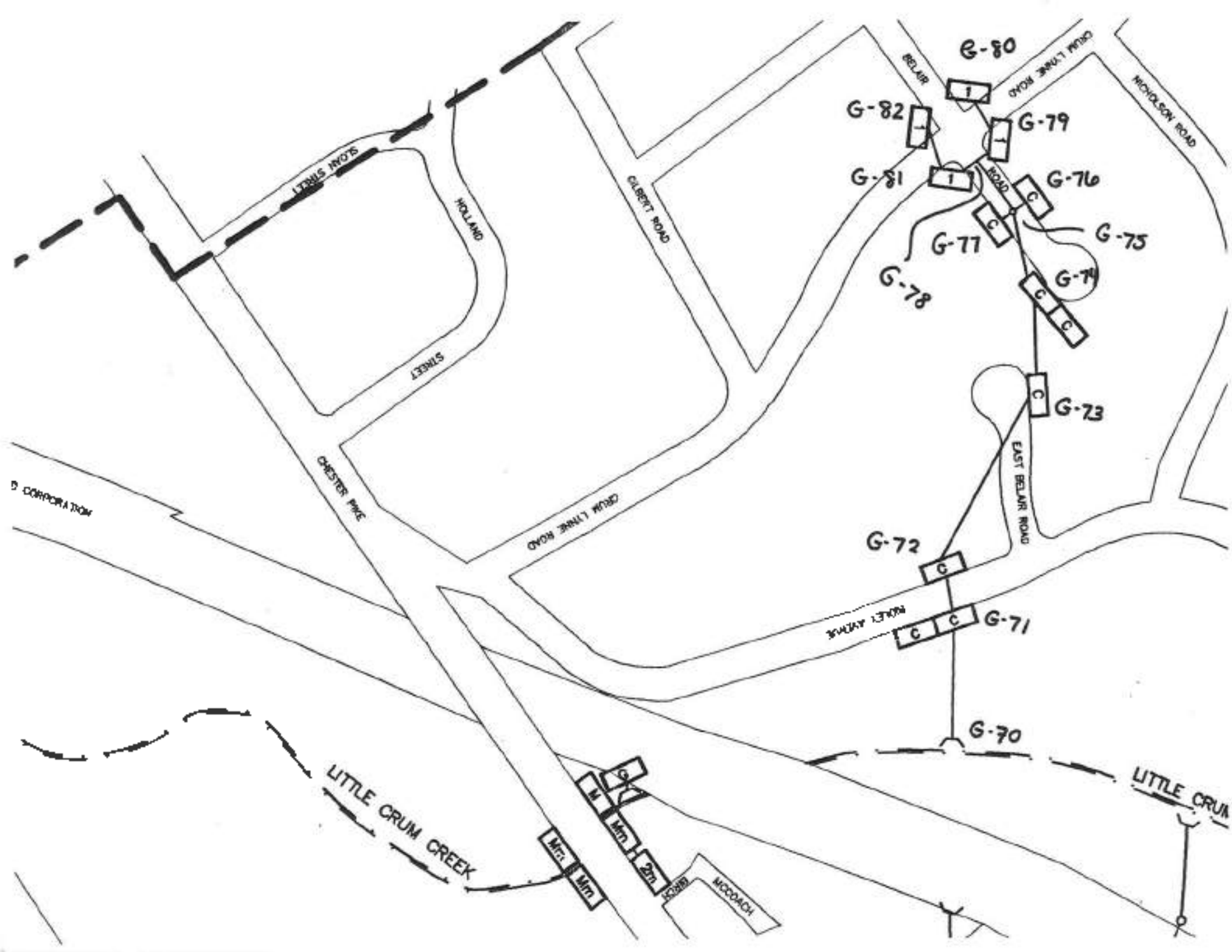
Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Pipe Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-593	G-594	X									N	Robert Poole 610-532-2118	Ridley Park Borough
G-594	G-595	X									N	Robert Poole 610-532-2119	Ridley Park Borough
G-595	G-596	X									N	Robert Poole 610-532-2120	Ridley Park Borough
G-596	G-597	X									N	Robert Poole 610-532-2121	Ridley Park Borough
G-597	G-598	X									N	Robert Poole 610-532-2122	Ridley Park Borough
G-595	G-599	X									N	Robert Poole 610-532-2123	Ridley Park Borough

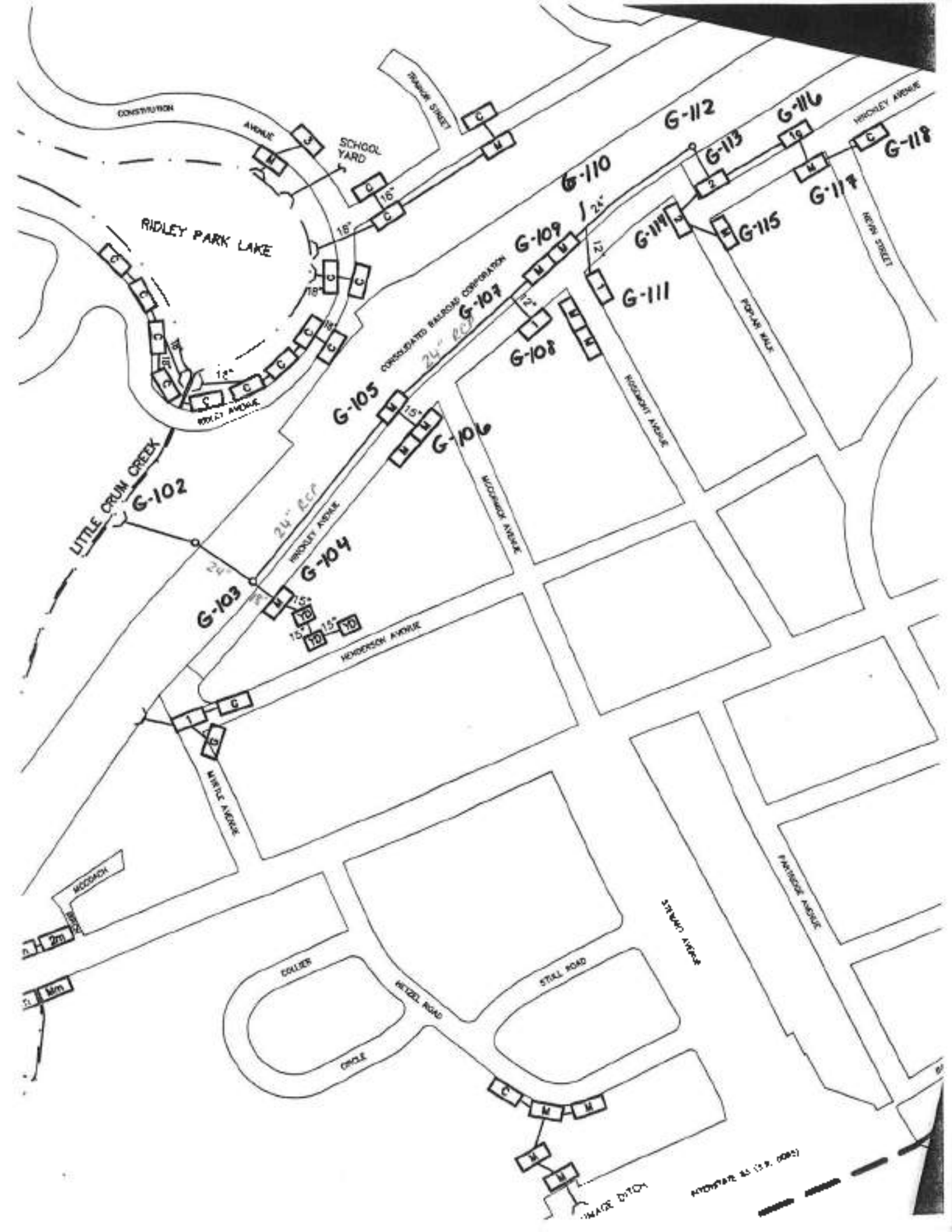


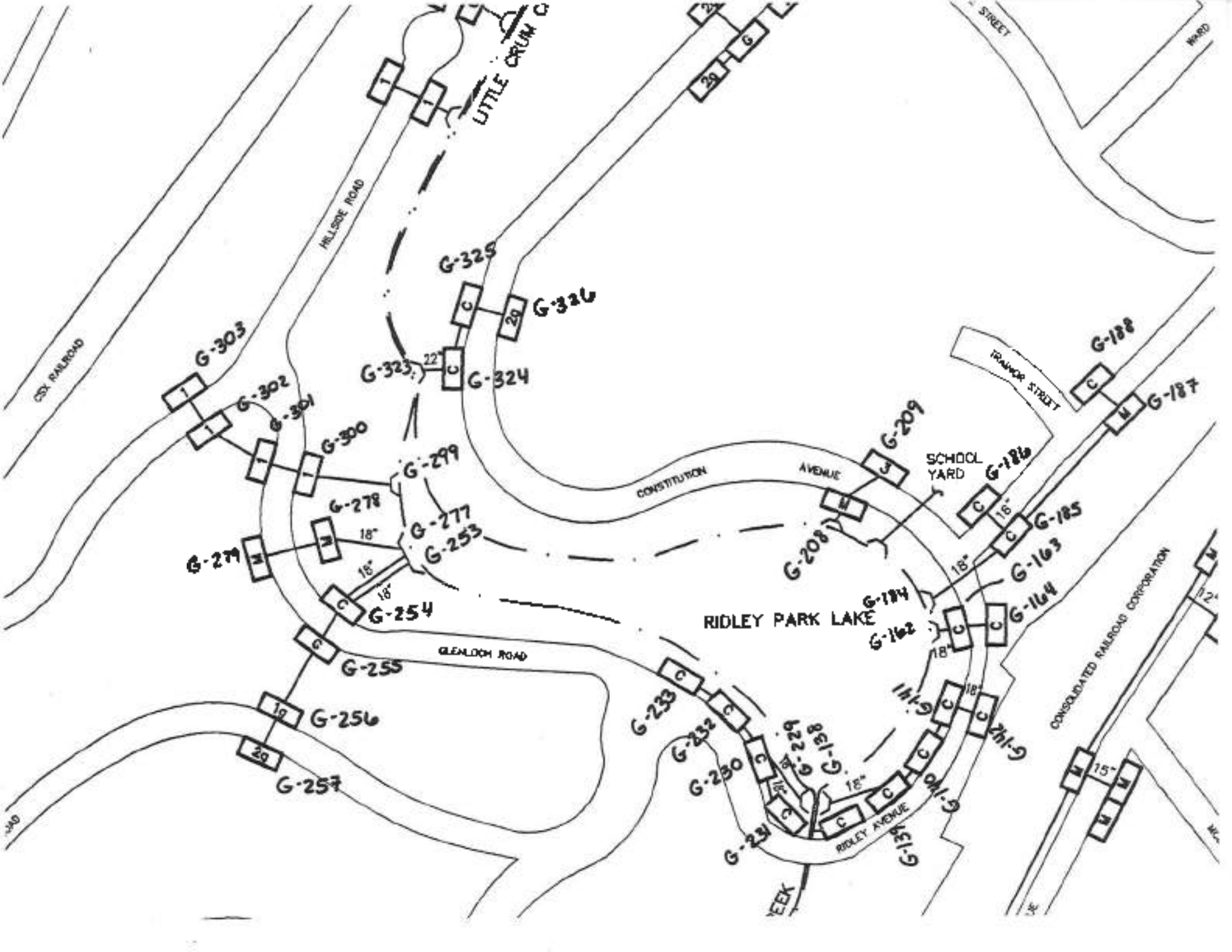
RIDLEY TOWNSHIP

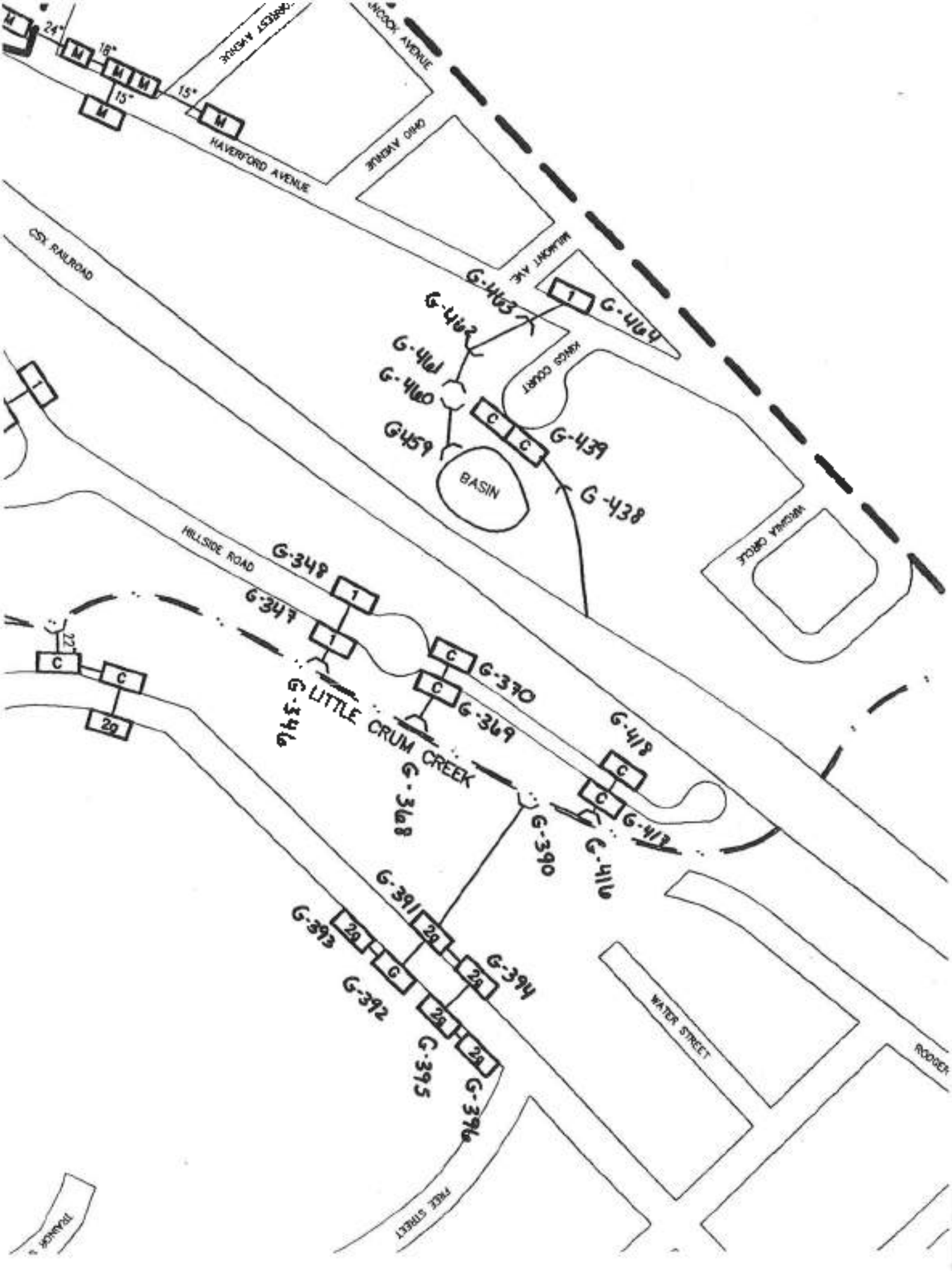

AVENUE
AVENUE
MOORACH
COLLIER
CIRCLE
CRUM LYNNE ROAD
G-26
G-27
2m
Mm
Mm
Mm
LITTLE CRUM CREEK
CHESTER PIKE
CONSOLIDATED RAILROAD CORPORATION
INTERSTATE 95 (S.R. 0095)
RIDLEY TOWN

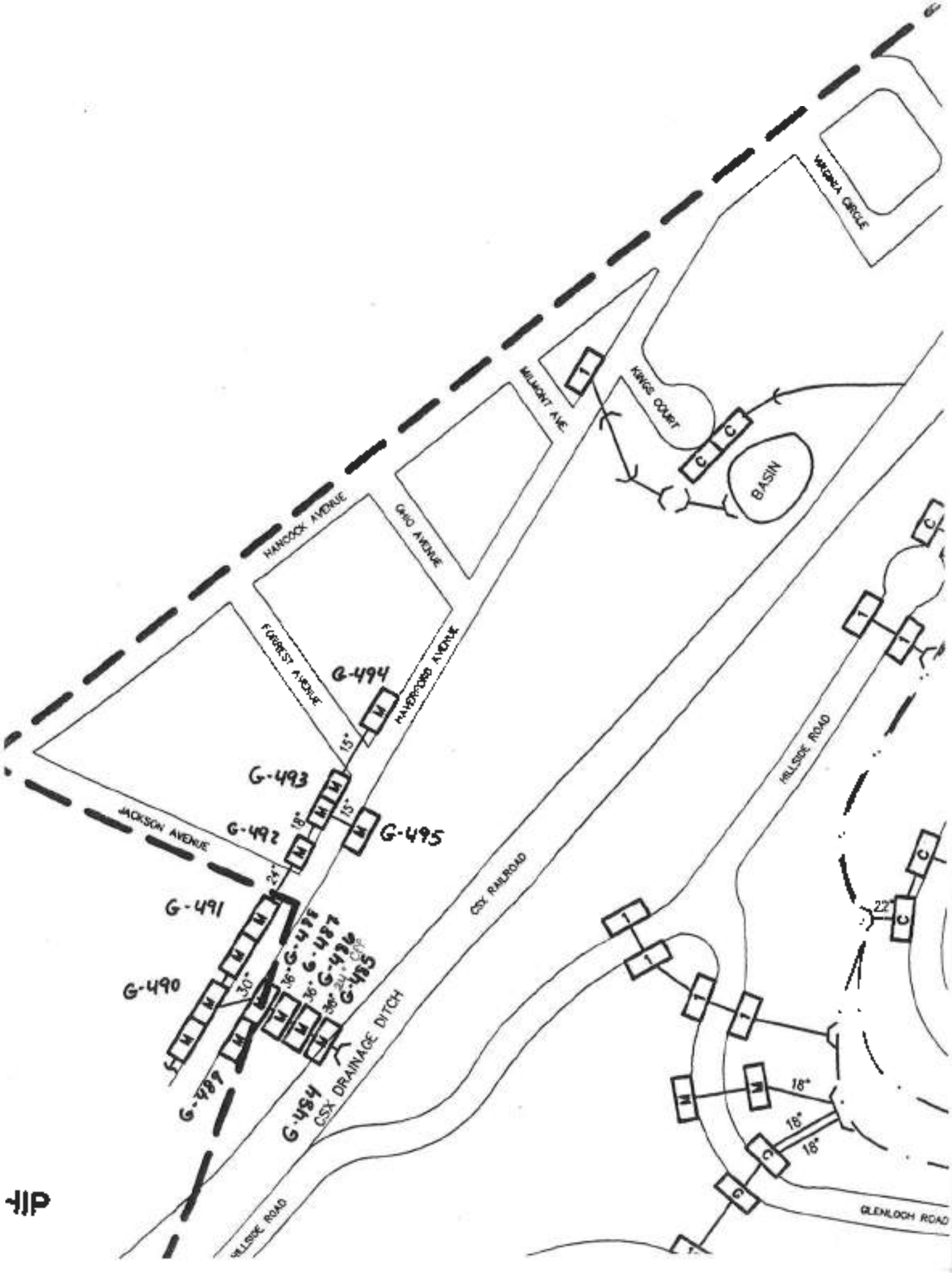

LITTLE CRUM CREEK
HINCKLEY AVENUE
HENDERSON AVENUE
EAST BELAIR ROAD
RIDLEY AVENUE
G-47
G-48
G-49
G-50
MYRTLE AVENUE
WOODACH
BIRCH
COLLIER
CIRCLE
CRUM LYNNE ROAD
CHESTER PIKE
LITTLE CRUM CREEK
PORATION
24"
15"
15"
2m
Mm
Mm
Mm

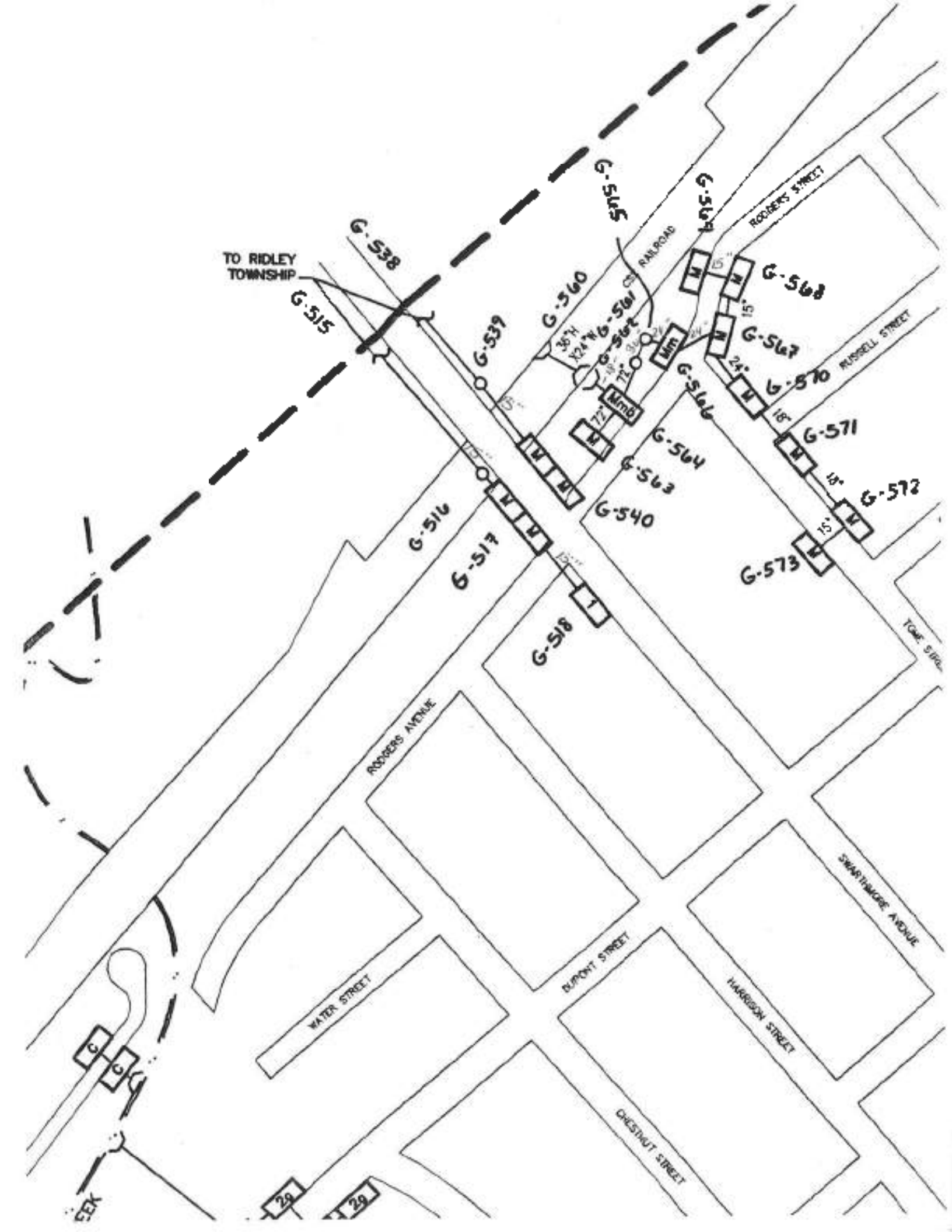

G-80
G-82
G-79
G-81
G-76
G-77
G-75
G-78
G-74
G-73
G-72
G-71
G-70
BELAIR
CREAM LYNNE ROAD
NICHOLSON ROAD
ROAD
HOLLAND
STREET
GILBERT ROAD
CHESTER PIKE
EAST BELAIR ROAD
LITTLE CRUM CREEK
MCCOACH

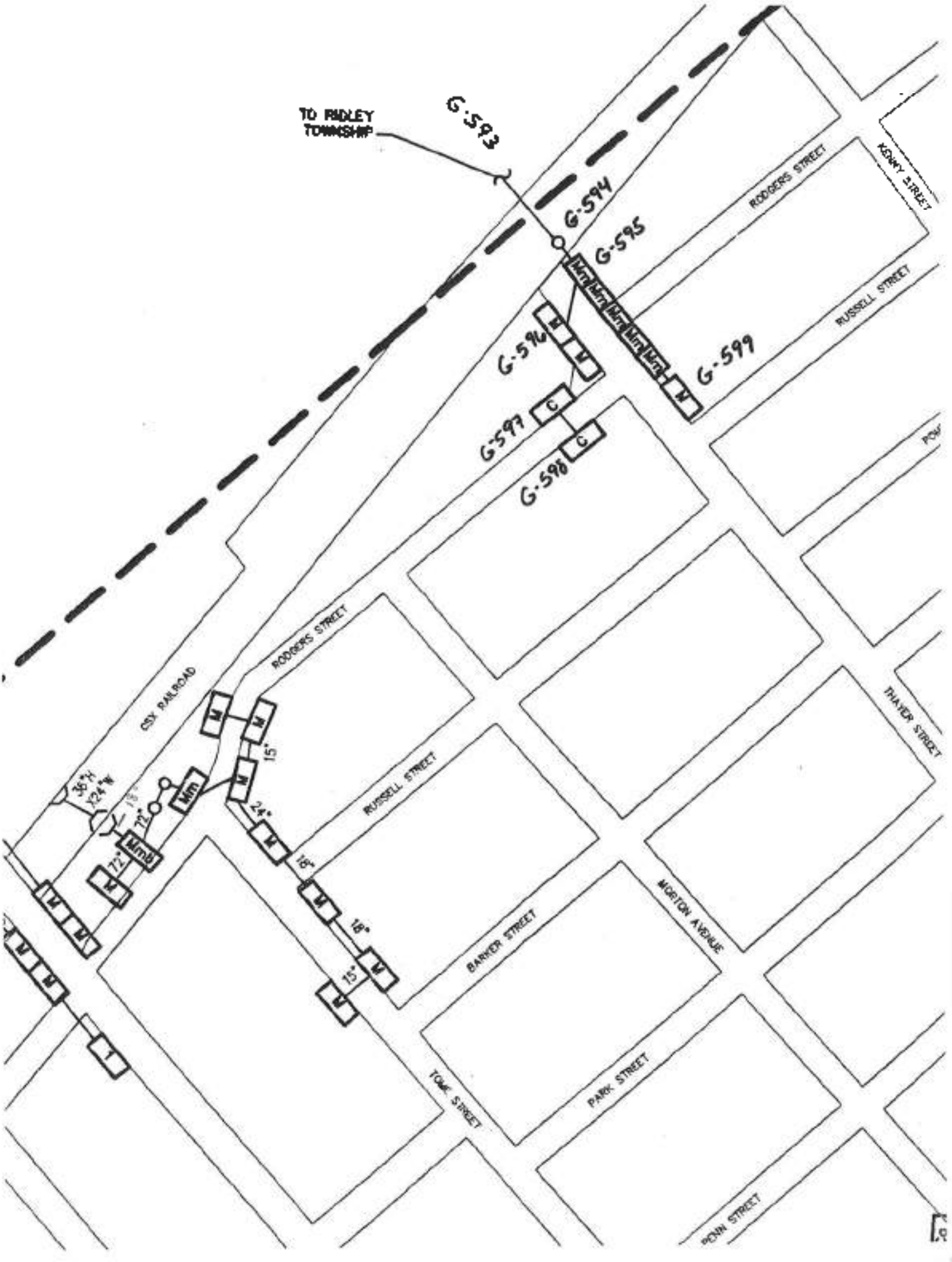

RIDLEY PARK LAKE
SCHOOL YARD
CONSTITUTION AVENUE
TRAINOR STREET
HINCKLEY AVENUE
CONSOLIDATED RAILROAD CORPORATION
LITTLE CRUM CREEK
MCCORMICK AVENUE
HENDERSON AVENUE
MINTLE AVENUE
MOORACH
COLLIER CIRCLE
METZEL ROAD
STILL ROAD
STEWART AVENUE
PARTRIDGE AVENUE
POPLAR WALK
NEVIN STREET
WOODMONT AVENUE
G-102
G-103
G-104
G-105
G-106
G-107
G-108
G-109
G-110
G-111
G-112
G-113
G-114
G-115
G-116
G-117
G-118
24" RCP
18"
15"
12"

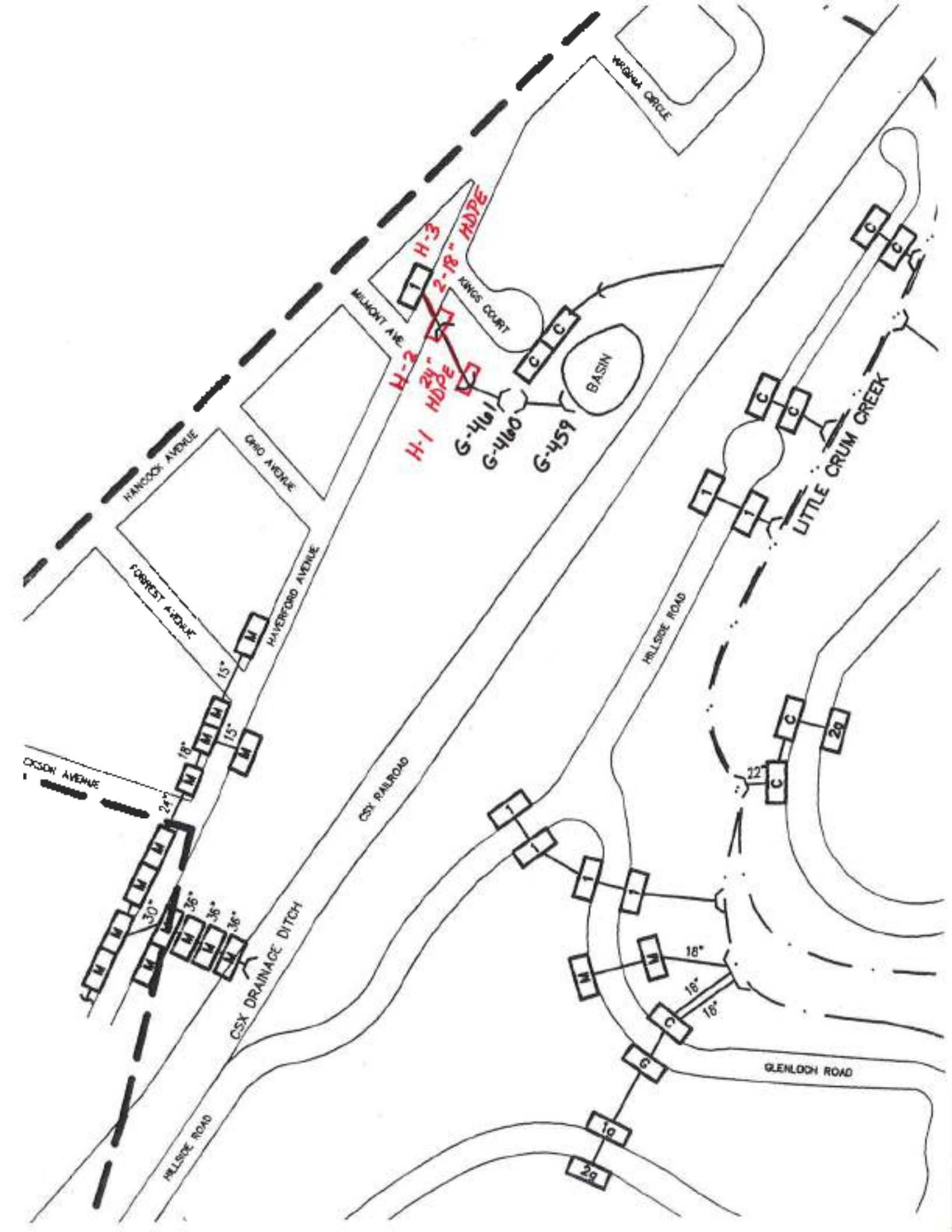

LITTLE CRUM C
HILLSIDE ROAD
CSX RAILROAD
G-303
G-302
G-301
G-300
G-299
G-278
G-277
G-279
G-253
G-254
G-255
G-256
G-257
G-325
G-326
G-323
G-324
22"
CONSTITUTION AVENUE
G-209
G-208
SCHOOL YARD
G-186
G-188
G-187
TRAINOR STREET
G-185
G-163
G-164
G-184
G-162
RIDLEY PARK LAKE
GLENLOCH ROAD
G-233
G-232
G-230
G-231
G-229
G-138
G-140
G-141
G-142
RIDLEY AVENUE
CONSOLIDATED RAILROAD CORPORATION
18"
16"
15"


HAVERFORD AVENUE
OHIO AVENUE
MILMONT AVE
CSX RAILROAD
KINGS COURT
BASIN
HILLSIDE ROAD
WESTWARD CIRCLE
WATER STREET
PAGE STREET
G-463
G-464
G-462
G-461
G-460
G459
G-439
G-438
G-348
G-347
G-370
G-369
G-346
LITTLE CRUM CREEK
G-368
G-418
G-417
G-390
G-416
G-391
G-393
G-392
G-394
G-395
G-396


VIRGINIA CIRCLE
KINGS COURT
BASIN
MILMONT AVE
HANCOCK AVENUE
OHIO AVENUE
FAIRFIELD AVENUE
G-494
G-493
G-492
G-495
G-491
G-490
G-487
G-484
JACKSON AVENUE
CSX RAILROAD
CSX DRAINAGE DITCH
HILLSIDE ROAD
GLENLOCH ROAD
15"
18"
24"
30"
36"


TO RIDLEY TOWNSHIP
G-515
G-538
G-539
G-560
G-561
G-562
G-563
G-564
G-545
G-546
G-547
G-568
G-569
G-570
G-571
G-572
G-573
G-540
G-516
G-517
G-518
RODGERS STREET
RUSSELL STREET
RODGERS AVENUE
WATER STREET
DUPONT STREET
HARRISON STREET
SWARTHMORE AVENUE
CHESTNUT STREET
RAILROAD
29
29


TO RIDLEY TOWNSHIP
G-593
G-594
G-595
G-596
G-597
G-598
G-599
RODGERS STREET
KENNY STREET
RUSSELL STREET
CSX RAILROAD
THAYER STREET
BARKER STREET
MORTON AVENUE
PARK STREET
TOME STREET
PENN STREET
15"
24"
18"
16"
15"
72"
72"
36"H
X24"W


VIRGINIA CIRCLE
H-3
2-18" HDPE
KINGS COURT
MILMONT AVE.
H-2
24" HDPE
H-1
G-461
G-460
G-459
BASIN
HANCOCK AVENUE
OHIO AVENUE
FORREST AVENUE
HAVERFORD AVENUE
CKSON AVENUE
CSX RAILROAD
CSX DRAINAGE DITCH
HILLSIDE ROAD
LITTLE CRUM CREEK
HILLSIDE ROAD
GLENLOCH ROAD
15"
15"
18"
24"
30"
36"
36"
36"
22"
18"
18"
18"

FORM H

PROPOSED STORMWATER COLLECTION SYSTEM FORM H.

SHEET 1 OF 1

WATERSHED

Name: Crum Creek
Municipality: Ridley Park Borough
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 11/15/2005

INSTRUCTIONS

On the map for proposed stormwater collection system(s), diagram each proposed system. Indicate a map point to show changes in system elements, pipe size, pipe direction and connections to existing system. For proposed additions to existing systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed, new system and one for each existing system having one or more proposed additions. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher (if H-3 ends one system, begin the next with H-20). Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system both on the map. See Sample Diagrams and Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Map I.D Nos.**	Proposed Constr. Dates		Design Data	Contact Person	Name of Final Ownership and
					Pipe	Channel / Swale									
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Available	Name and Phone	Maintenance Responsibility
G-461	H-1	X			24"				RCP	A-6	Nov-05	Nov-05		Robert Poole 610-532-2100	Ridley Park Borough
H-1	H-2	X			24"				HDPE	A-6	Nov-05	Nov-05		Robert Poole 610-532-2101	Ridley Park Borough
H-2	H-3	X			18" (x2)				HDPE	A-6	Nov-05	Nov-05		Robert Poole 610-532-2102	Ridley Park Borough
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														
H-	H-														

*See measurement key on reverse side. **Enter the stormwater problem areas' Map I.D. Nos., if proposed project will solve or reduce any / all of the drainage problems.

FORM I

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM I.				SHEET 1 OF 1
WATERSHED Name: Crum Creek Municipality: Ridley Park Borough County: Delaware		FORM COMPLETED BY Name: Jamie H. Bricker Telephone: 610-532-2884 Date: 11/16/2005	**DEFINITION** FLOOD HAZARD AREA A normally dry land area that has been or is susceptible to being inundated by the 100-year flood.	
For County Use:				
Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
I - 1	Ridley Park Swim Club, Recreation	1959 (?)	Box 352 Ridley Park, PA 19078	
I -				
I -				
I -				
I -				
I -				
I -				
I -				

Form J

WATER QUALITY PROBLEM AREAS FORM J.											SHEET 1 OF 1
WATERSHED				FORM COMPLETED BY							
Name:	Crum Creek			Name	Jamie H. Bricker						
Municipality:	Ridley Park Borough			Telephone:	610-532-2884						
County:	Delaware			Date:	11/16/2005						
SITE	J-1	J-	J-	J-	J-	J-	J-	J-	J-	J-	
Types of Water Quality Problems											
High Community Tolerance											
High Temperature											
High Turbidity	X										
Hydrocarbon Pollution											
Low Community Diversity											
Low Dissolved Oxygen											
Low pH											
Nutrient Enrichment											
Poor Habitat											
Other/Explanation Line No.											
Potential Cause(s)											
Agriculture											
Construction Site											
Erosion	X										
Lake Discharge											
STP Outfall											
Other/Explanation Line No	1										
Frequency											
Year Most Recent Occurence	2005										
Year First Known Occurence	?										
Source of Information											
County Water Quality Study											
Driveby	X										
Other/Explanation Line No.											

EXPLANATION LINES
1 Heavy sediment in basin above lake, dredging approximately every other year
2
3
4
5
6
7
8
9
10

Turning Ideas Into Reality

CATANIA ENGINEERING ASSOCIATES, INC.
Consulting Engineers & Land Surveyors

March 30, 2004
File No 83600-115-8

Justin D. Kauffman
Delaware County Planning Department
Government Center
201 W. Front Street
Media, PA 19063-2751

Re Borough of Ridley Park
Crum Creek Act 167 Stormwater Management Plan

Dear Mr. Kauffman,

Enclosed please find the completed Form O - Outfall Data and Storm Sewer Map locating all outfalls for the Crum Creek Watershed.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

Jamie H Wenger

Jamie H Wenger, EIT
for Catania Engineering Assoc., Inc.

JHW/lns
Enclosure
cc: Bob Poole

520 W MacDade Boulevard Milmont Park, Pennsylvania 19033-3311
Phone: (610) 532 2884 Fax: (610) 532-2923 E-Mail: CEAINC1@aol.com

Form O - Outfall Data

Person: David Rowlyk, Highway Forman Date: 3/30/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches; ≥ 0.1 inches Days Since Last Rain: four

Municipality: Borough of Ridley Park Name of receiving water: Crum Creek via Little Crum Creek

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth (feet)	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
LCC - 1	N/A	Yes	2:30 PM	8"	0	12"	8'	1 : 4	No	N/A	residential	0
LCC - 11	N/A	Yes	2:24 PM	48"	2"	1'	8'	1 : 8	Yes	oil sheen / rust color	residential	1
LCC - 21	N/A	Yes	1:55 PM	18"	0	1'	4'	2 : 1	No	N/A	residential	0
LCC - 31	N/A	Yes	1:55 PM	18"	0	1'	4'	2 : 1	No	debris	residential	0
LCC - 41	N/A	Yes	2:00 PM	18"	0	1'	6'	2 : 1	No	N/A	residential	1
LCC - 51	N/A	Yes	2:05 PM	24"	0	1'	4'	2 : 1	No	N/A	residential	0
LCC - 61	N/A	Yes	2:05 PM	18"	0	2'	4'	2 : 1	No	N/A	residential	0
LCC - 71	N/A	Yes	2:06 PM	18"	0	2'	4'	2 : 1	No	N/A	residential	0
LCC - 81	N/A	Yes	1:32 PM	18"	0.5"	1'	2'	2 : 1	Yes	oil sheen / rust color	residential	1

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity, or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drains)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person: David Rowlyk, Highway Foreman Date: 3/30/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: ≥ 0.1 inches: ≥ 0.1 inches Days Since Last Rain:

Municipality: Borough of Ridley Park Name of receiving water: Crum Creek

Pipe Sample #	Photo #	Storm Drain? Yes No N/A	Time (00:00) a/p/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth (feet)	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, oleac or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
LCC - 91	N/A	Yes	1:34 PM	36"	2"	1'	4'	2 : 1	Yes	rust color	residential	1
LCC - 101	N/A	Yes	1:36 PM	24"	0	1'	4'	2 : 1	No	N/A	residential	0
LCC - 111	N/A	Yes	1:16 PM	18"	0	3'	2'	1 : 1	No	N/A	residential	0
LCC - 121	N/A	Yes	1:18 PM	18"	0	2'	4'	1 : 3	No	N/A	residential	0
LCC - 131	N/A	Yes	1:20 PM	18"	0	1'	4'	1 : 5	No	N/A	recreational	0
LCC - 141	N/A	Yes	1:22 PM	48"	0	1.5'	3'	1 : 5	No	N/A	residential	0
LCC - 151	N/A	No Ditch	10:57 AM	None	0	0	0	1 : 2	No	N/A	residential	0
LCC - 161	N/A	Yes	11:00 AM	24"	0	6'	6'	1 : 2	No	N/A	residential	0
LCC - 171	N/A	Flat Ditch	11:05 AM	None	0	0	0	1 : 2	No	N/A	residential	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no stains or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2= Impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling blocked catch basins or drain)

H:V = Horizontal to vertical ratio

* I.C. = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person: David Rowlyk, Highway Forman Date: 3/30/04 Time Since Last Rain was ≥ 72 Hours: Yes___

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain: four

Municipality: Borough of Ridley Park Name of receiving water: Crum Creek via Little Crum Creek

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (HH:00) am-pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth (feet)	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
LCC - 181	N/A	Flat Ditch	11:06 AM	0	0	0	0	1 : 2	No	N/A	railroad	0
LCC - 191	N/A	Yes	1:07 PM	16"	0	3'	6'	1 : 2	No	algae, rust color	residential	1
LCC - 201	N/A	Yes	1:07 PM	36"	0	4'	6'	1 : 2	No	sediment	railroad / res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, Hooked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

RIDLEY TOWNSHIP

RIDLEY TOWNSHIP

STORMWATER INFORMATION

Provided for:

Act 167 Crum Creek Watershed

Stormwater Management Plan

93033-11C-SO

CEA file

Form Description Summary
Act 167 Watershed Storm Water Management Plan

Form	Description	Types of Examples	Sources of Information
A	Storm Water Problem Areas	Flooding Drainage Erosion/Sedimentation	Existing Studies or Reports Township Documentation Personal Memory Township Engineer
B	Obstructions	Bridges Culverts Fill Structures	Owner of Structure Township Files Subdivision Applications Roadmasters Township Engineer
C	Existing Flood Control Projects	Channel, Excavation Rip-Rap Floodwalls, etc	Township Records Township Engineer Owner of Facility
D	Proposed Flood Control Projects	Channel Excavation Rip-Rap Floodwalls, etc.	Township Records Township Engineer Owner of Facility
E	Existing Storm Water Control Facility	Detention Basins Recharge Basins Roof-Top Storage	Subdivision Files Township Engineer Owner of Facility
F	Proposed Storm Water Control Facility	Detention Basins Recharge Basins Roof-Top Storage	Subdivision Files Township Engineer Owner of Facility
G	Existing Storm Water Collection System	Storm Sewers Man-Made Channels Diversions	Existing Plans Township Engineer Owner of System (Developers)
H	Proposed Storm Water Collection System	Storm Sewers Man-Made Channels Diversions	Existing Plans Township Engineer Owner of System (Developer)
I	Present & Projected Development in the Flood Hazard Area	Subdivision/Site Plans	Flood Insurance Studies Subdivision/Site Plans General Knowledge Township Engineer Private Flood Studies
J	Water Quality Problems	Construction Site Agriculture	Municipalities Conservation District

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: Ridley Township

Contact Person: Anne E. Howanski, Manager

WPAC Designee: Charles J. Catania, Jr.

Title: Township Engineer

Address: 520 W. MacDade Boulevard

Milmont Park, PA 19033-3311

Phone: 610-532-2884

Fax: 610-532-2923

Person Completing form (if different from Contact Person):

Name: Jamie H. Bricker

Address: 520 W. MacDade Boulevard

Milmont Park, PA 19033-3311

Phone: 610-532-2884

Fax: 610-532-2923

E-mail: jamie@cataniaengineering.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	Chapter 325	
Subdivision/Land Development Ordinance	No. 1443	
Separate Stormwater Ordinance	No. 1688	
Separate Floodplain Ordinance	Under SLDO No. 1443	

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors	X	X		
Municipal Engineering Department				
Municipal Planning Department	X		X	
County Planning Department	X		X	
County Conservation District	X	X		
Zoning Hearing Board			X	X
Consulting Engineer	X		X	
Others (List Below				

Township Commissioners are considered Supervisors. The Zoning Officer will forward the approved/disapproved variances to the applicant along with the necessary permit(s).

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

Zoning Chapter 325

Subdivision and Land Development Ordinance No. 1443

Stormwater Management Design Ordinance No. 1688

PART III – MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	March 2002		
Comprehensive Land Use Plan	Dec 1974		
Existing Land Use Maps	Dec 1974		
Proposed Land Use Maps	Dec. 1974		
Zoning Maps	May 2001	(revisions)	

PART IV – FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	N
Participates in FEMA Regular Program	Y

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1
- Repeat for all forms.

The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide <u>detailed</u> descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map

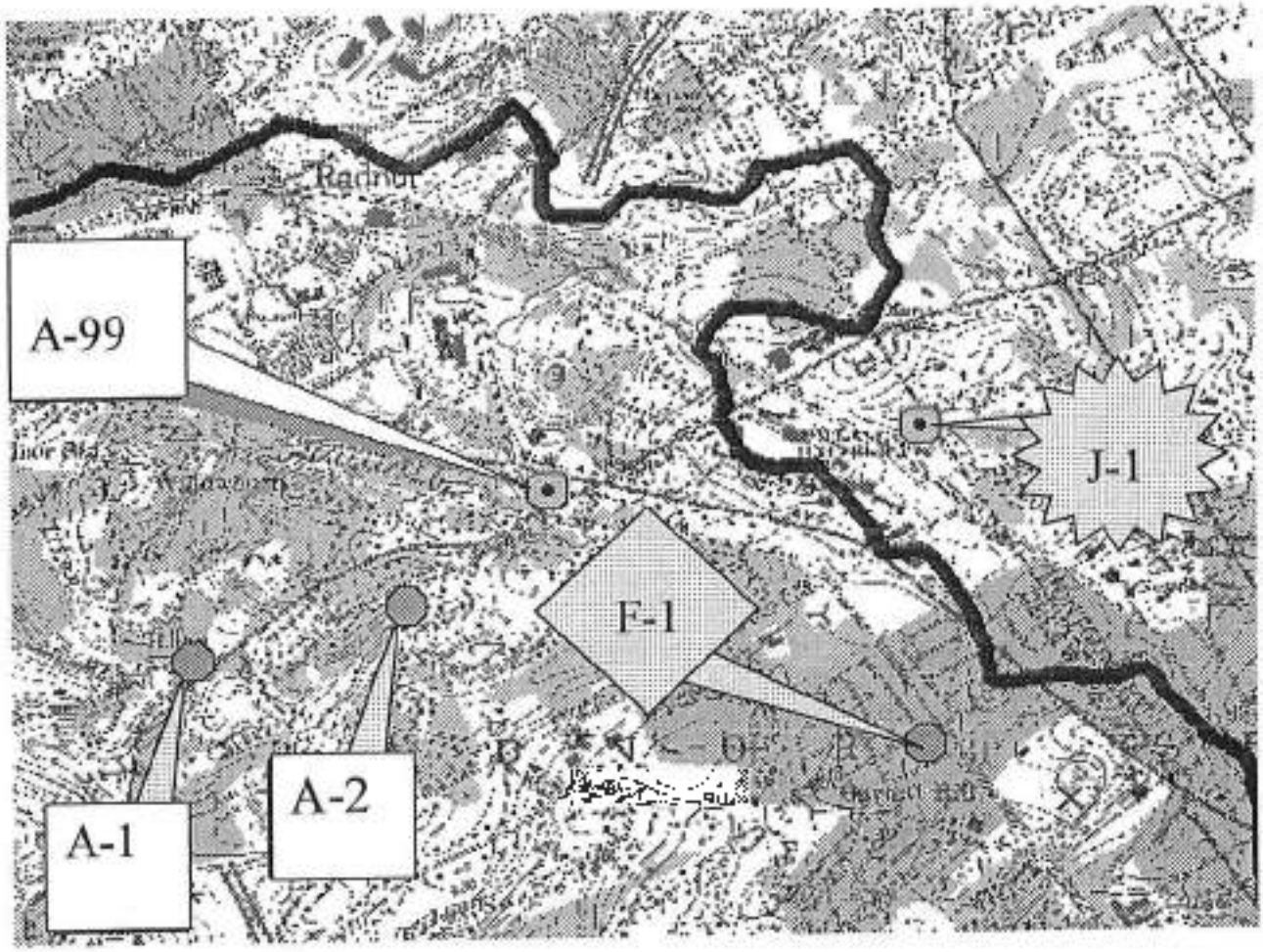


Table of Contents

Form A: Stormwater Problem Areas

Form C: Existing Flood Control Projects

Form D: Proposed Flood Control Projects

Form E: Existing Stormwater Control Facilities

Form F: Proposed Stormwater Control Facilities

Form G: Existing Stormwater Collection System

Forms G-1 through G-25

Form H: Proposed Stormwater Collection System

Form I: Present and Projected Development in the Flood Hazard Area

Form J: Water Quality Problems

FORM A - STORM WATER PROBLEM AREAS SHEET 1 OF 2

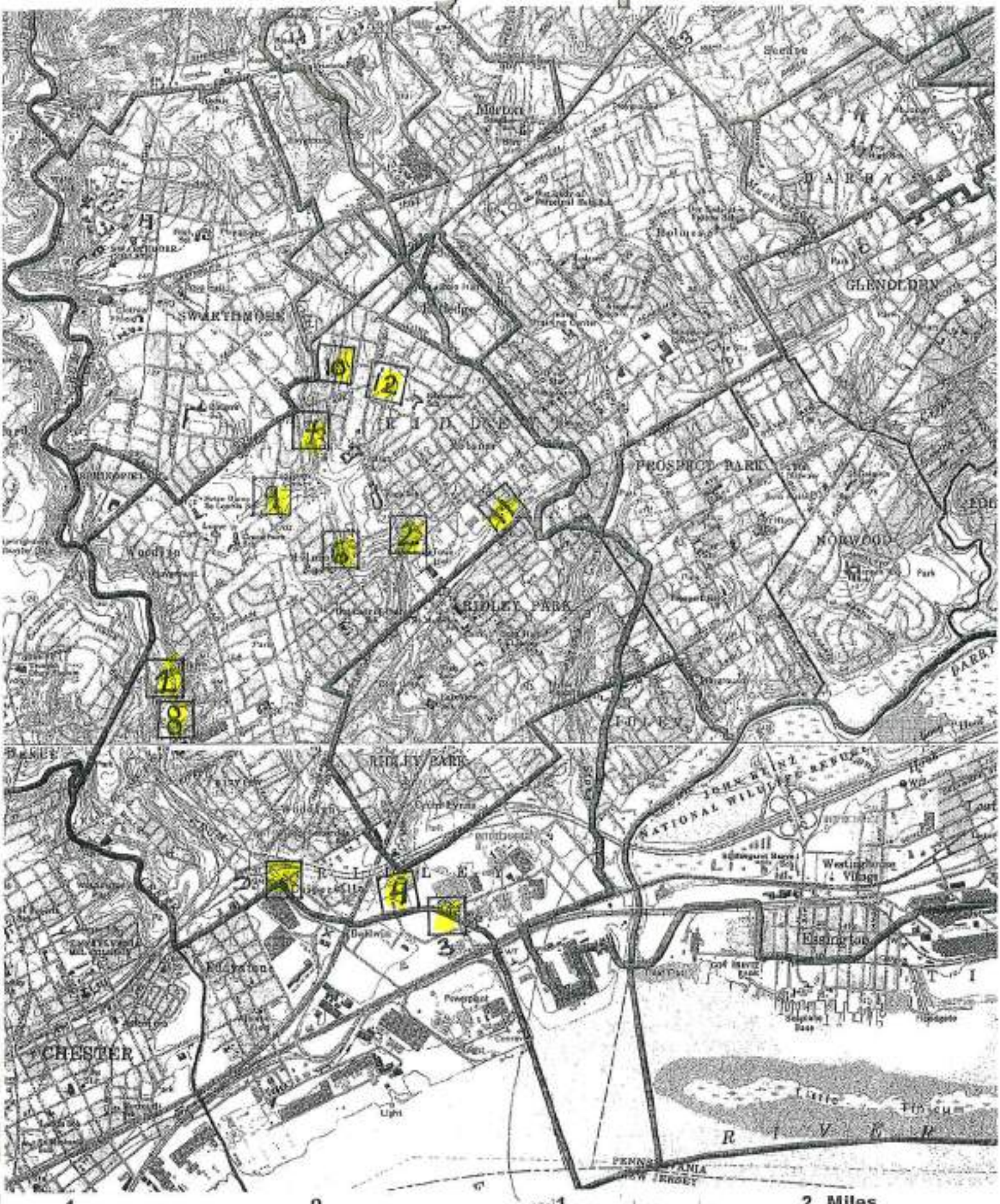
WATERSHED		FORM COMPLETED BY		Before Filling Out Form See Instructions on Back
Name:	Crum Creek	Name:	Jamie H Bricker	
Municipality:	Ridley Township	Telephone:	610-532-2884	For County Use
County:	Delaware	Date	8/18/2004	

MAP NO *	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12
Types of Storm Water Problems												
Flooding	X	X	X	X	X	X	X		X	X	X	
Accelerated Erosion	X					X	X	X	X	X	X	X
Sedimentation										X		
Landslide												
Groundwater												
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)	1	2	3	4	5	6	7	8	9	10	11	12
Cause (s)												
Storm Water Volume	X	X	X	X	X	X	X	X	X	X	X	
Storm Water Velocity	X					X	X	X	X	X		X
Storm Water Direction						X	X	X	X	X		
Water Obstruction					X		X		X	X	X	
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	2004	2004	2002	2002	2003	2004	2003	2004	2003	2002	2002	2002
Year First Known Occurred	?	?	?	?	?	?	?	?	?	?	?	?
Regularity												
More Than 1 Year	X	X					X					
Less Than 1 Year			X	X	X	X			X	X	X	
Only During Agnes												
Duration (If Applicable)												
Less Than 1 Day	X	X	X	X	X	X	X		X	X	X	
1 Day + (Enter Days)												
Property Damage												
Loss of Life/Vital Services					X							
Private			X	X		X	X	X	X	X	X	X
More Than One Owner						X	X	X	X	X	X	X
Types of Properties	R		Ind	Ind		R	R	R	R	R	R/C	R
Number of Properties			1	1		12	8	5	6	20	8	4
Public (List Types)		X			X							
Explanation Line No. (On Back)		2			5		7					
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed			X	X								
Explanation Line No. (On Back)			3	4								12

* Include Map ID No. if found on any other form listing proposed facilities

	FORM A - STORM WATER PROBLEM AREAS SHEET 2 OF 2
	EXPLANATION LINES
1	CC flooding and erosion at Bullens Lane bridge
2	Lincoln St. flooding
3	CC flooding on Boeing's site, formally proposed floodwall to alleviate
4	LCC flooding on Boeing's site, formally proposed berm to protect site
5	CC flooding at Chester Pike bridge
6	LCC flooding and erosion at Manor Circle/Arlington upstream to the municipal boundary
7	LCC flooding behind Georgetown Road several homes flooded, rock deflector installed
8	CC streambank erosion behind Valley Rd
9	LCC UNT flooding and erosion near Milmont Ave and Brookside Ave
10	LCC UNT flooding and erosion behind Muhlenberg Ave
11	2nd Avenue flooding
12	LCC UNT erosion near Edgewood Ave and Village Rd, rip rap installed

Ridley Twp.


GLENOLDEN
PROSPECT PARK
NORWOOD
RIDLEY PARK
CHESTER
Eddystone
Essington
Little Tinicum
PENNSYLVANIA
NEW JERSEY
1
0
1
2 Miles

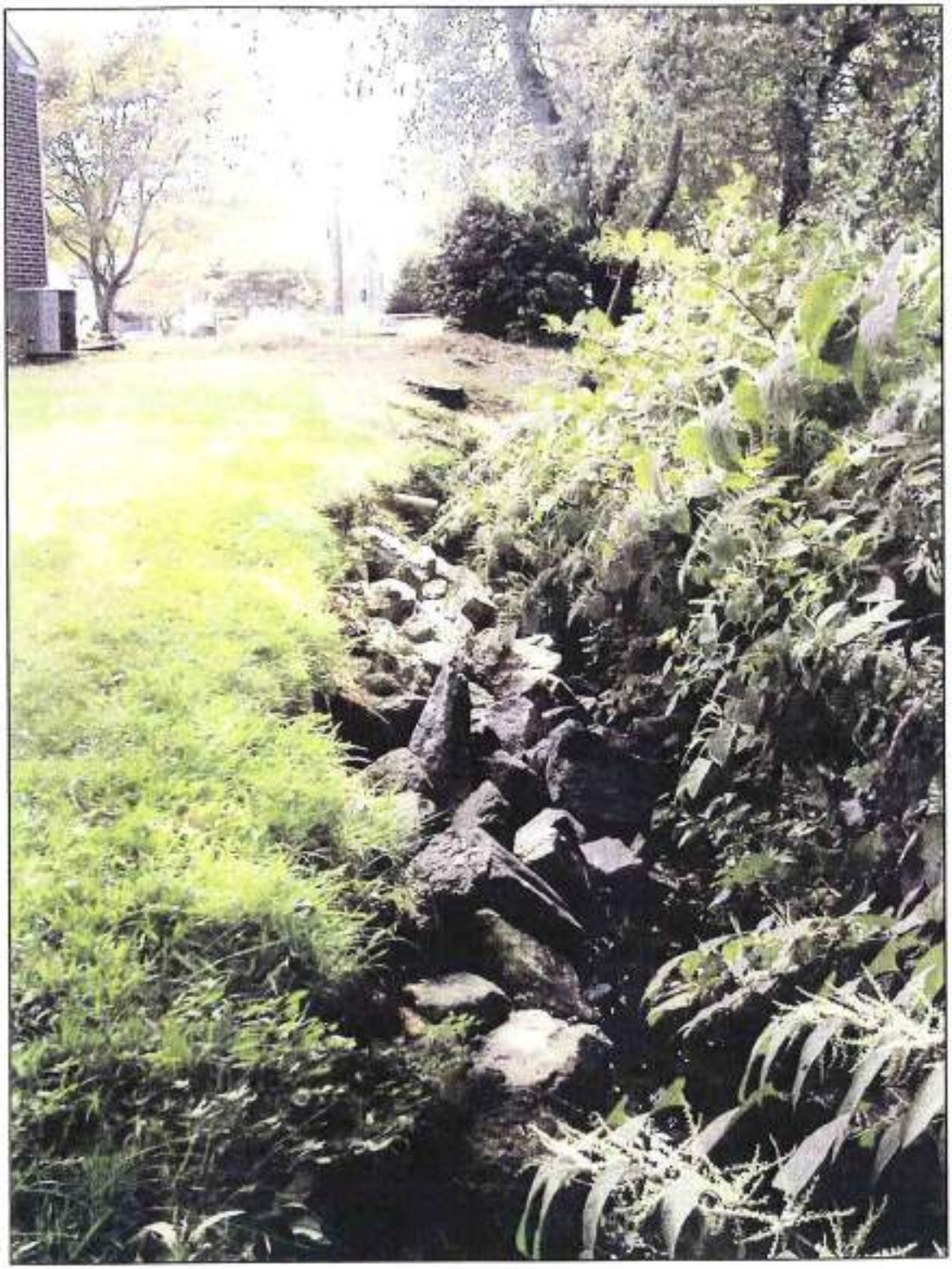
FORM C

EXISTING FLOOD CONTROL PROJECT FORM C SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name.	Jamie H. Bricker	Channel Excavation / Widening	Levee	Dams
Municipality:	Ridley Township	Telephone:	610-532-2834	Channel Realignment	Gabions	Floodwall
County:	Delaware	Date.	8/18/2004	Rock R prap	Pipe Channel	Concrete Lining

For County Use.

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs	Design Flood Frequency Yrs	Design Flood Discharge C F S. (if known)	Owner Name, Address, and Phone
C-1	rock deflector installed for bank stabilization on Little Crum Creek west of Georgetown Rd	2000	100	N/A	N/A	Anne E. Howanski (610) 534-4606 100 E. Mac Dade Blvd, Folsom, PA 19033
C-2	rip rap installed on eroded banks near Edgewood Ave and Village Rd	2003	10	N/A	N/A	see A-12 Theresa Benson (610) 338-0923 916 Edgewood Ave. Folsom, PA 19033
C-						
C-						
C-						



Little Crum Creek, Unnamed tributary
Rip rap bank stabilization near Edgewood Ave and Village Rd
Identified as A-12 and C-2

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D.

SHEET 1 OF 1

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2684
Date: 8/18/2004

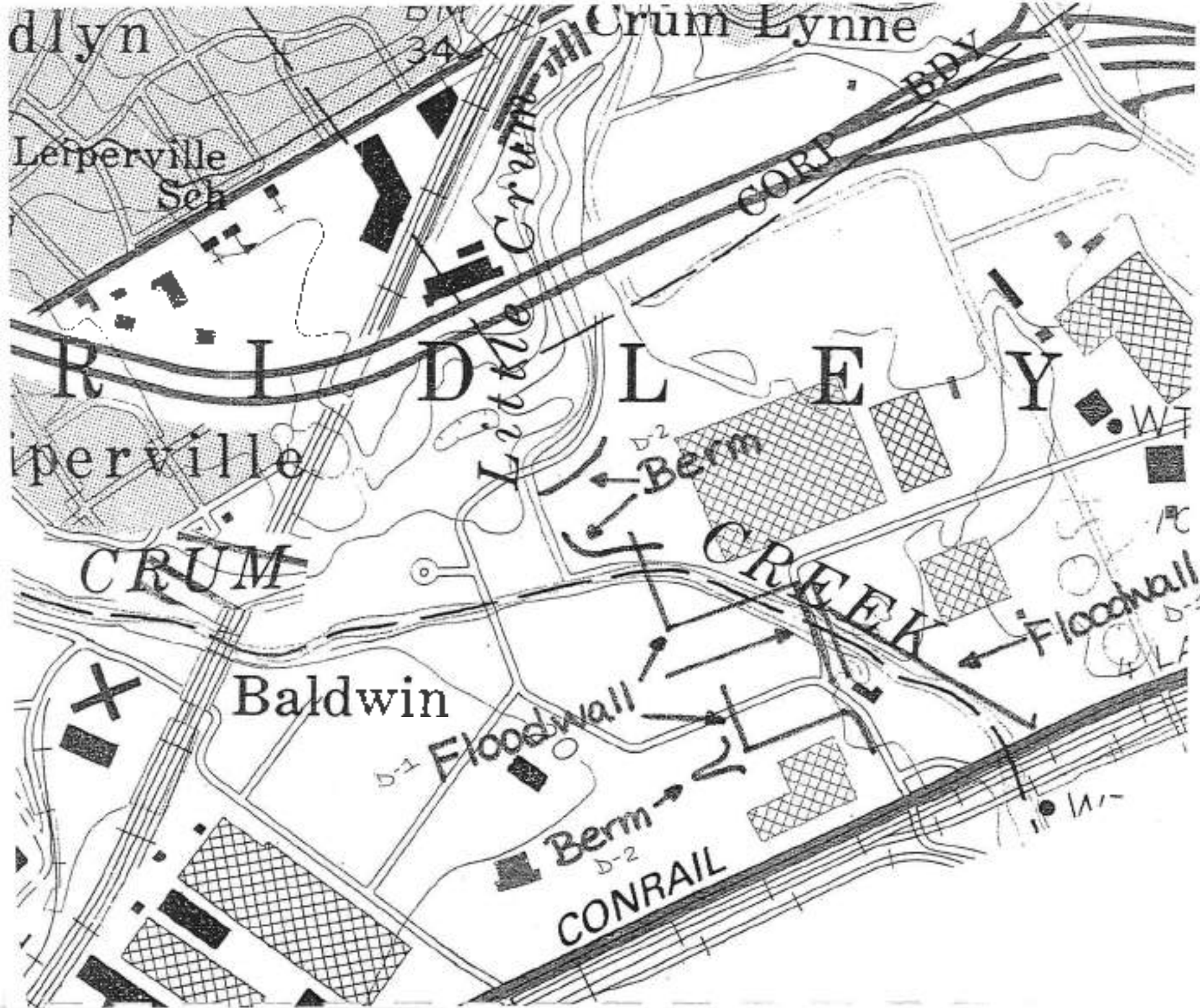
TYPICAL TYPES OF FLOOD CONTROL PROJECTS

Channel Excavation / Widening
Channel Realignment
Rock Riprap
Levee
Gabions
Pipe Channel
Dams
Floodwall
Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complt'n Date	Expected Life Yrs.	Design Flood		Map I.D No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S		
		Prelim.	Final								
D-1	floodwall		X		2004/ 2005	2005	100	100-yr.	10335	3	The Boeing Company (Dale Davis) P.O. Box 16858 P25-75 Philadelphia, PA 19142-0858 (610) 591-2006
D-2	berm		X		2004/ 2005	2005	100	100-yr.	10335	4	The Boeing Company (Dale Davis) P.O. Box 16858 P25-75 Philadelphia PA 19142-0858 (610) 591-2006
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.


dlyn
Crum Lynne
34
Leiperville
Sch
CORP
BDY
Little Crum Creek
R I D L E Y
iperville
Berm
D-2
CRUM
CREEK
Floodwall
D-1
Baldwin
Floodwall
D-1
Berm
D-2
CONRAIL

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Crum Creek Municipality: Ridley Township County: Delaware	Name: Jamie H. Bricker Telephone 610-532-2884 Date 8/17/2004	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-1	Retention Basin	1983	Janet Carano, Executive Director (610) 490-6205 1855 Constitution Ave. Woodlyn PA 19094	Delaware County Housing Authority
E-2	Retention Basin	1983	Janet Carano, Executive Director (610) 490-6206 1856 Constitution Ave. Woodlyn PA 19094	Delaware County Housing Authority
E-3	Retention Basin	2001	Swarthmore Green Estates Willowbend Drive, Folsom, PA 19033	Swarthmore Green Estates
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

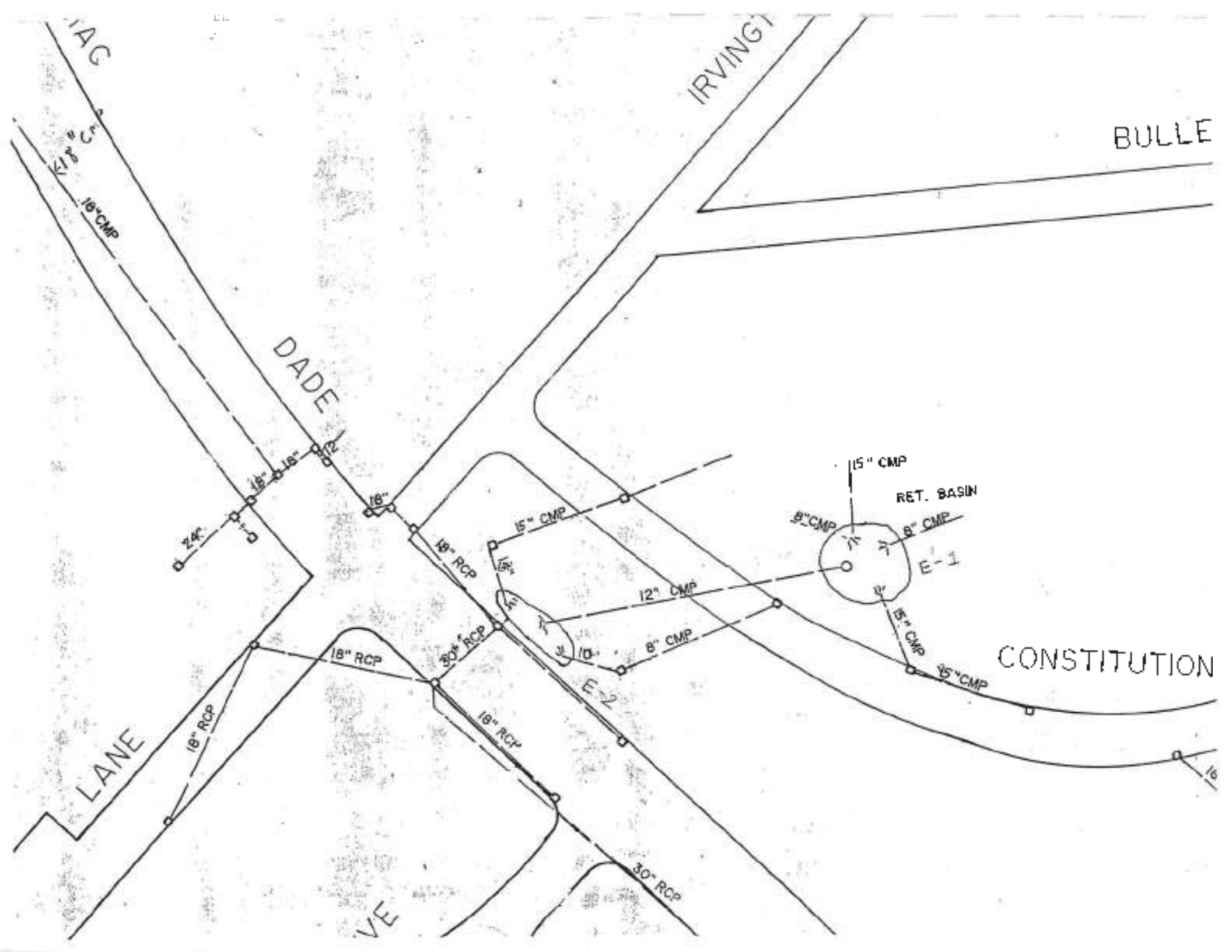
Natural Pond or Wetland

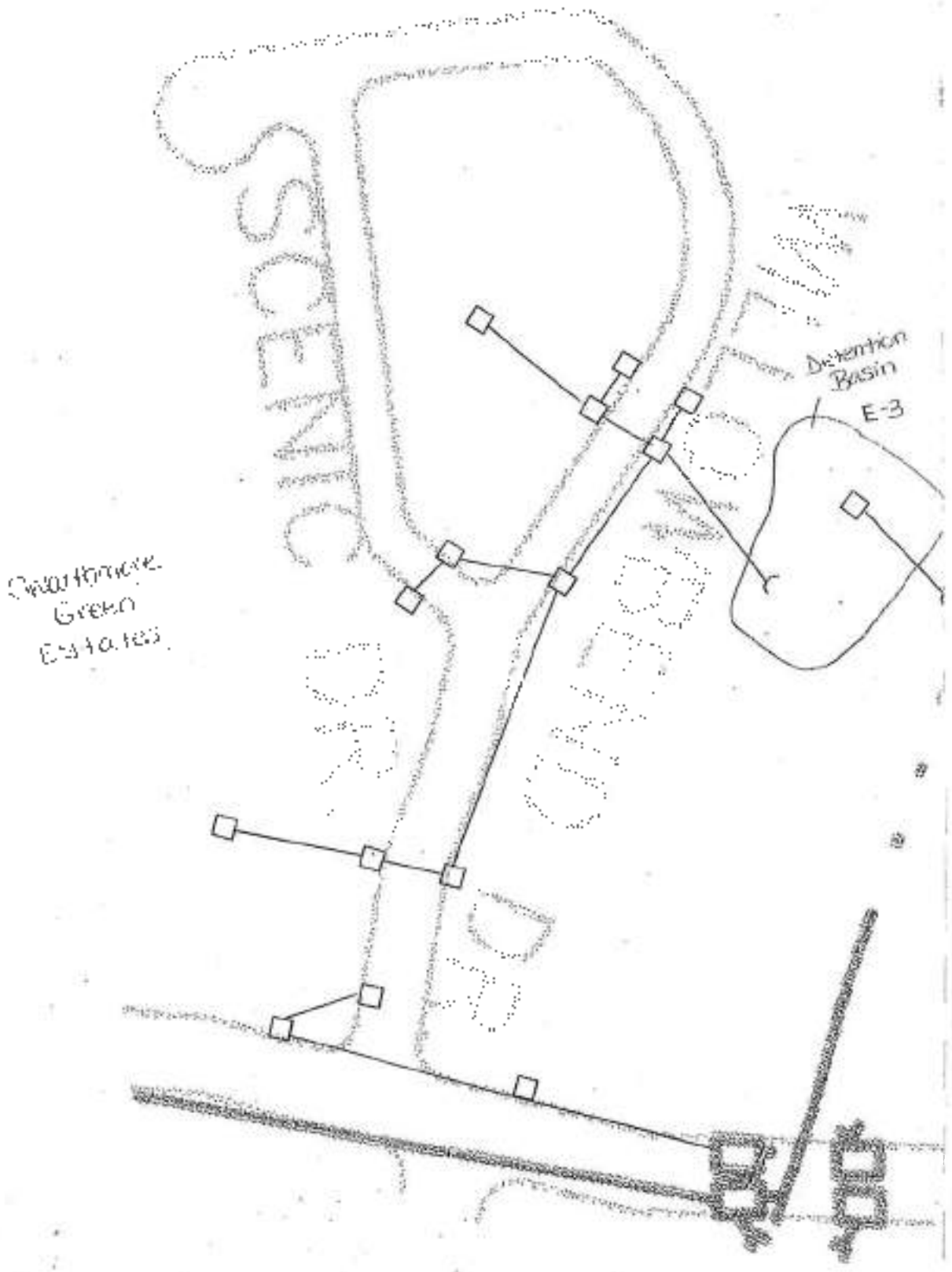
Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)


IAC
IRVING
BULLE
DADE
LANE
VE
CONSTITUTION
18"CMP
24"
18"
18"
12"
18"
18" RCP
15" CMP
12"
12" CMP
8" CMP
30" RCP
18" RCP
18" RCP
18" RCP
30" RCP
E-2
15" CMP
RET. BASIN
8"CMP
8" CMP
E-1
15" CMP
35"CMP


Scenic
Detention Basin
E-3
Cheltenham Green Estates

FORM F

PROPOSED STORM WATER CONTROL FACILITIES FORM F SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		DEFINITION
Name:	Crum Creek	Name:	Jamie H Bricker	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
Municipality:	Ridley Township	Telephone:	610-532-2884	
County:	Delaware	Date:	8/17/2004	

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Data Start	Proposed Constr. Data End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F-	No proposed stormwater control facilities exist within the Ridley Township, Crum Creek Watershed					
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the stormwater problem area's Map ID No., if the proposed project will solve or reduce one / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (1)

EXISTING STORM/WATER COLLECTION SYSTEM FORM G. SHEET 1 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

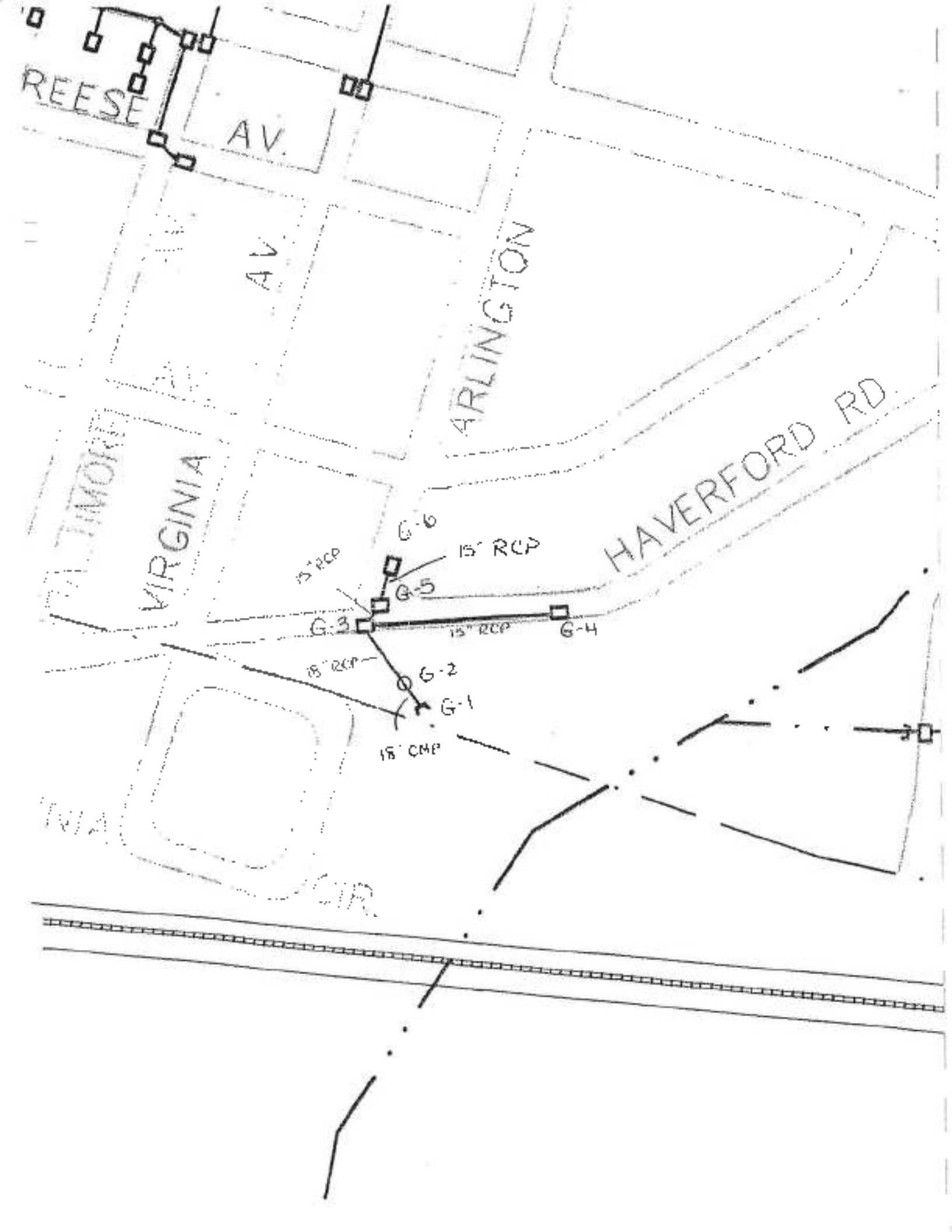
FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 5/9/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1	G-2	X			18"				CMP	c. 1951	no	Anne Howanski 610-833-1922	Ridley Township
G-2	G-3	X			18"				RCP	c. 1951	no	Anne Howanski 610-833-1923	Ridley Township
G-3	G-4	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-3	G-5	X			15"				RCP	c. 1951	no	Anne Howanski 610-833-1923	Ridley Township
G-5	G-6	X			15"				RCP	c. 1998	no	Anne Howanski 610-833-1924	Ridley Township


REESE
AV.
AV
ARLINGTON
HAVERFORD RD
VIRGINIA
G-6
15" RCP
15" RCP
G-5
G-3
15" RCP
G-4
15" RCP
G-2
G-1
18" CMP

FORM G (2)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 3 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-38	G-40	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-39	G-41	X			30"				RCP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-41	G-42	X			24"				RCP	c. 1995	no	Robert Poole 610-532-2100	Ridley Park Borough
G-42	G-43	X			18"				RCP	c. 1995	no	Robert Poole 610-532-2101	Ridley Park Borough
G-43	G-44	X			15"				RCP	c. 1995	no	Robert Poole 610-532-2102	Ridley Park Borough
G-43	G-45	X			15"				RCP	c. 1995	no	Robert Poole 610-532-2103	Ridley Park Borough

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 2 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

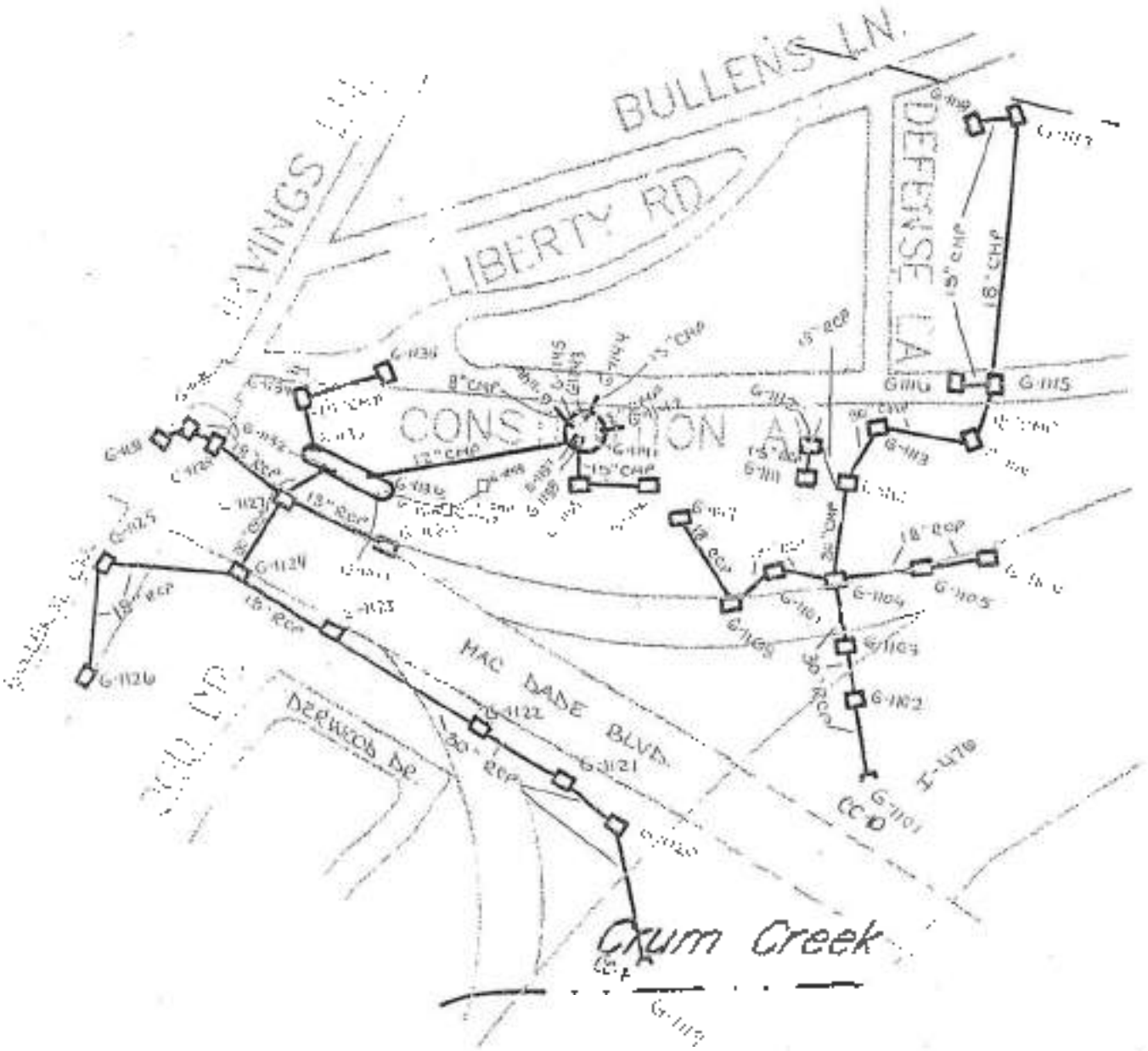
FORM COMPLETED BY

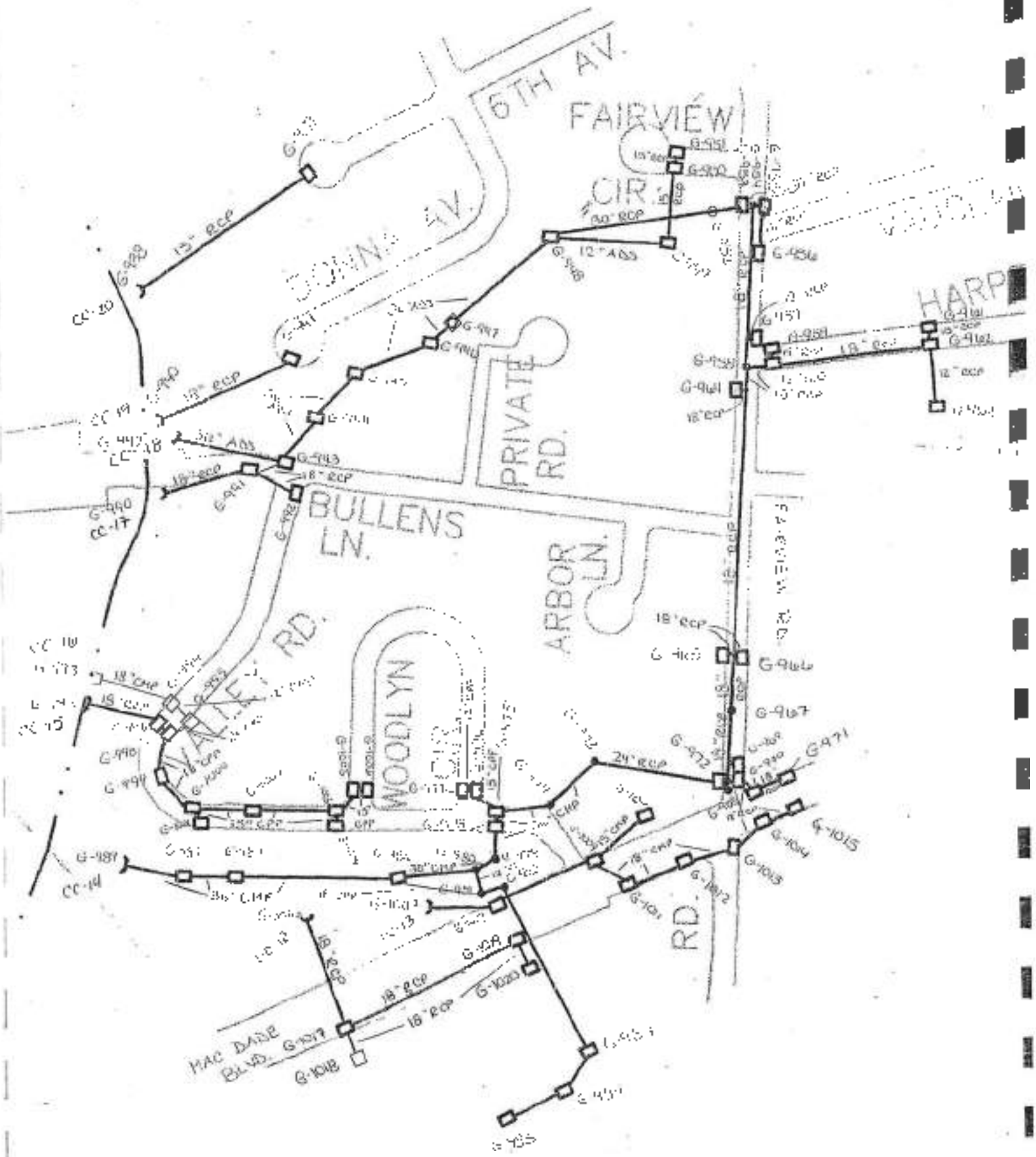
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/9/2004

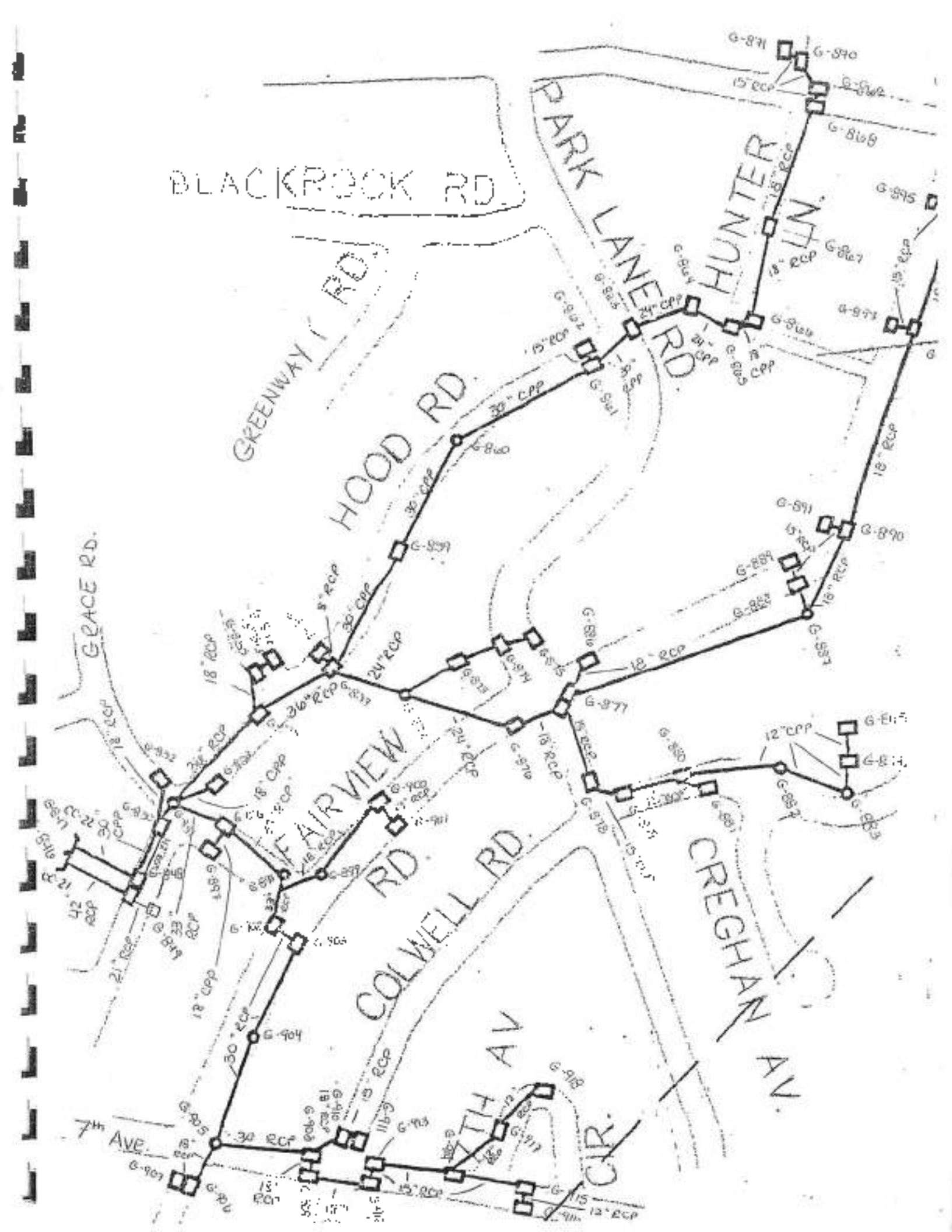
INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points with n a system consecutively (ex. G-1, G-2, G-3). Start the firs; point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse

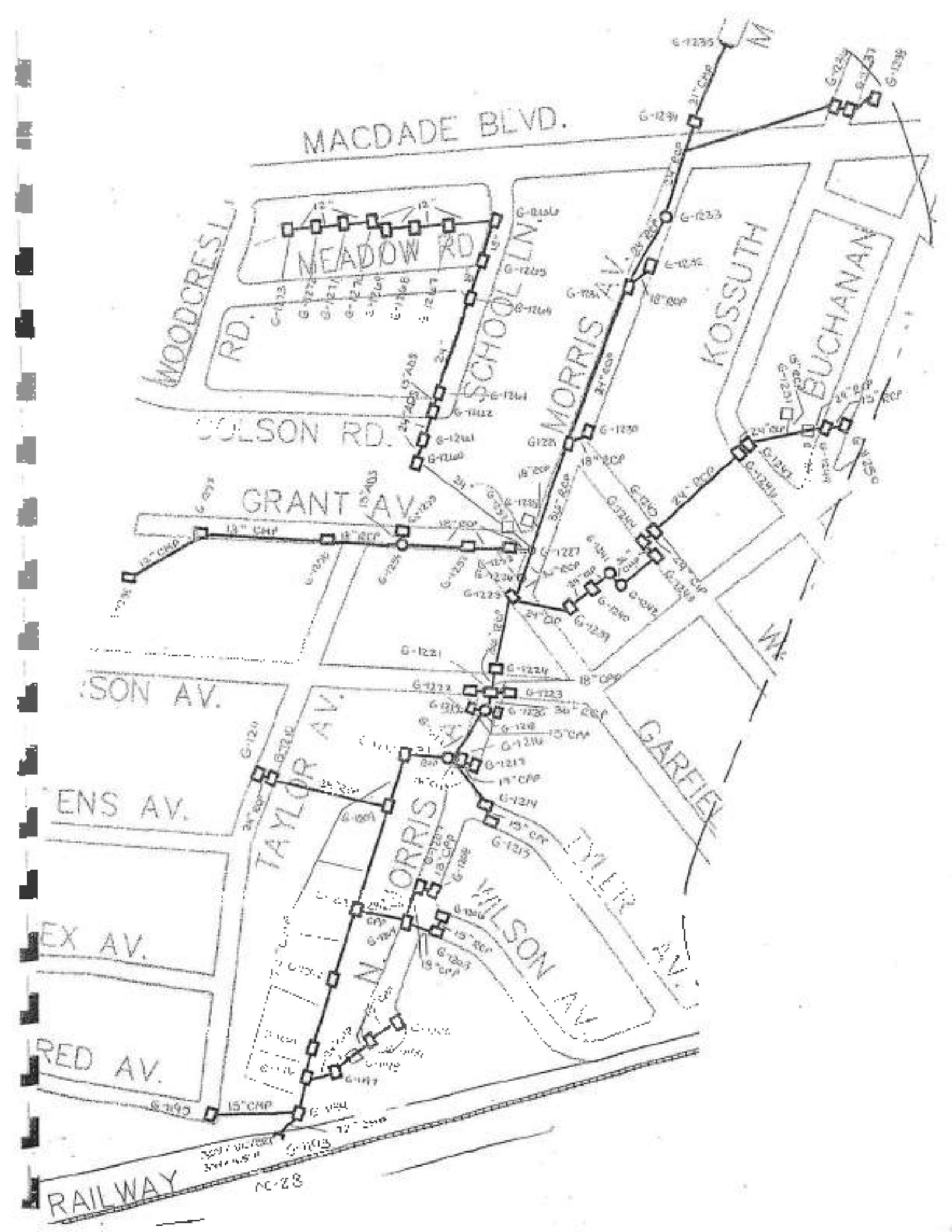
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-26	G-27	X			24"				Type 'S' CPP	c. 1995	no	Robert Poole 610-532-2100	Ridley Park Borough
G-27	G-28	X			36"				RCP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-28	G-29	X			30"				RCP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-29	G-30	X			12"				CPP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-29	G-31	X			24"				RCP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-31	G-32	X			24"				RCP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-31	G-33	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-32	G-34	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-34	G-35	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-34	G-36	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-34	G-37	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-37	G-38	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-38	G-39	X			6"				RCP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township

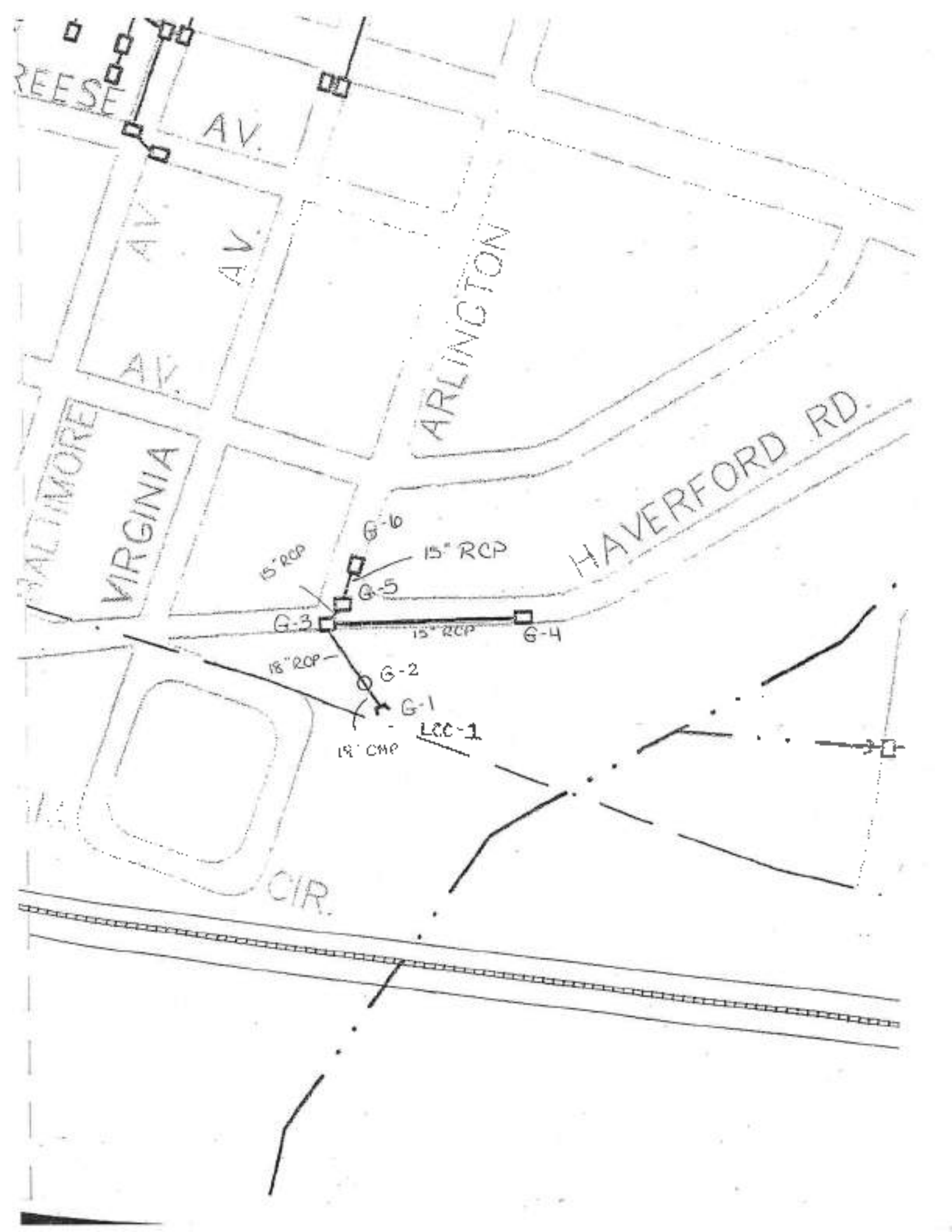

BULLENS LN.
LIBERTY RD.
DEFENSE LA
CONSTITUTION AV
MAC DADE BLVD.
Drumm Creek
CC-D
G-1115
G-1126
G-1102
G-1101

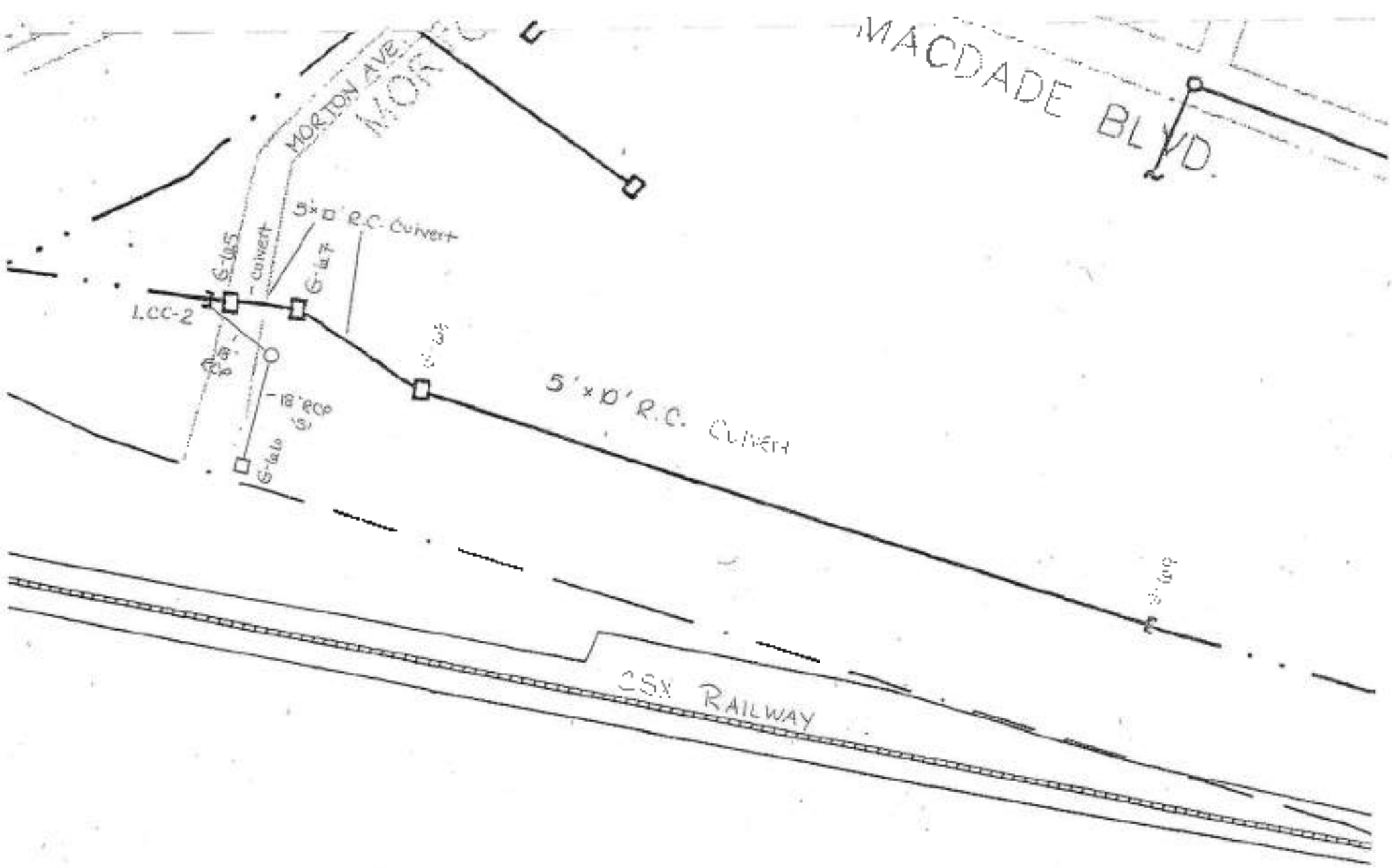

6TH AV.
FAIRVIEW CIR.
PRIVATE RD.
BULLENS LN.
ARBOR LN.
WOODLYN CIR.
RD.
MAC DADE BLVD.
HARP

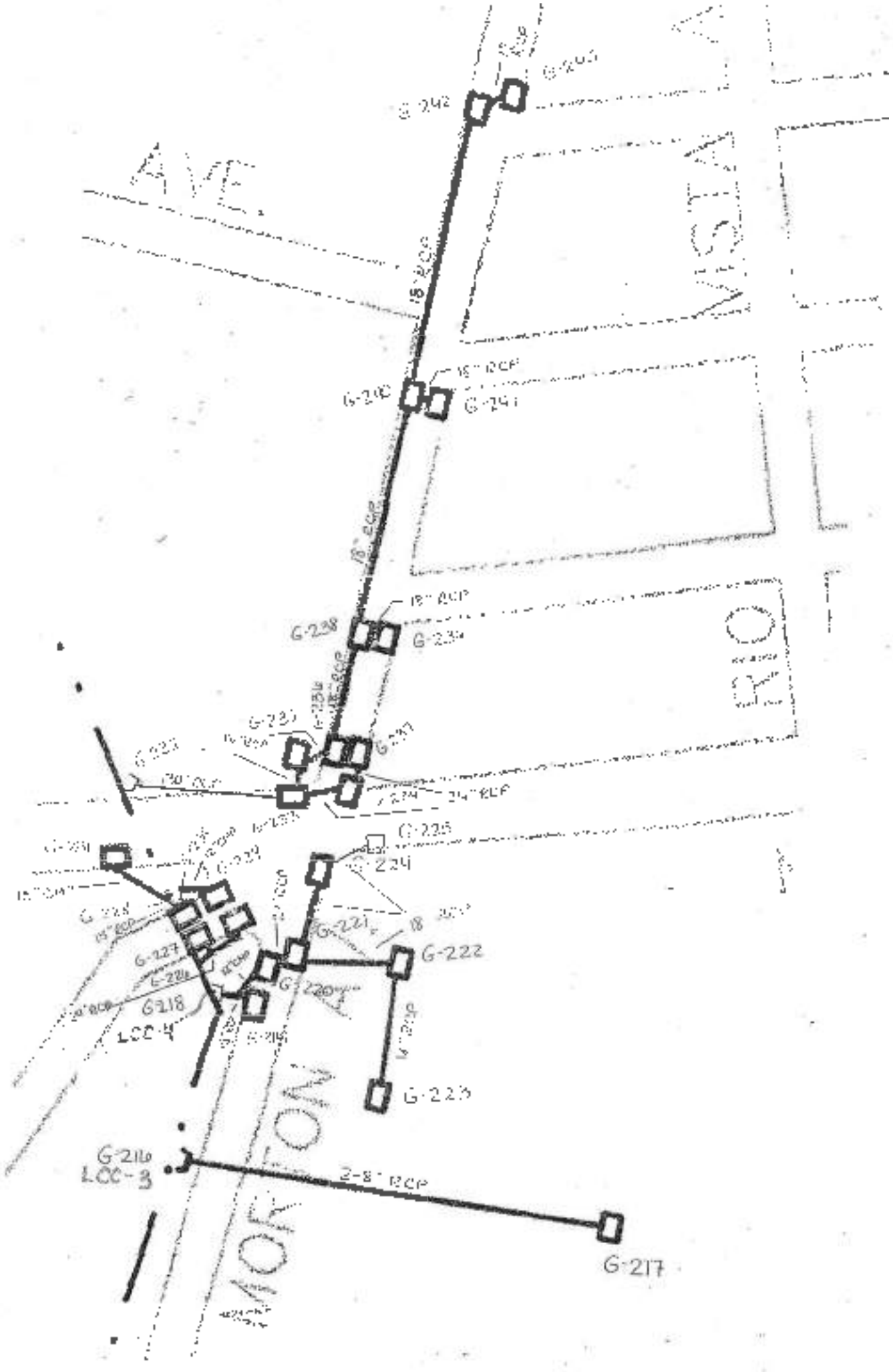

BLACKROCK RD.
GREENWAY LN.
PARK LANE RD.
HUNTER LN.
HOOD RD.
GRACE RD.
FAIRVIEW RD.
COLWELL RD.
CREGHAN AV.
7TH AV
CIR.
7th Ave.
G-871
G-870
G-869
G-867
G-866
G-865
G-864
G-863
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15" RCP
18" RCP
24" RCP
30" RCP
36" RCP
42" RCP
12" CPP
18" CPP
24" CPP
30" CPP
36" CPP
42" CPP
15" ECP
18" ECP
24" ECP
30" ECP
36" ECP
42" ECP

GRACE RD.
BLACKROCK RD.
CONWAY RD.
MICHIGAN AV.
SCHIAVELLO DR.
CONWAY CT.
BLACKROCK RD.
PARK LANE
RAYMOND RD.

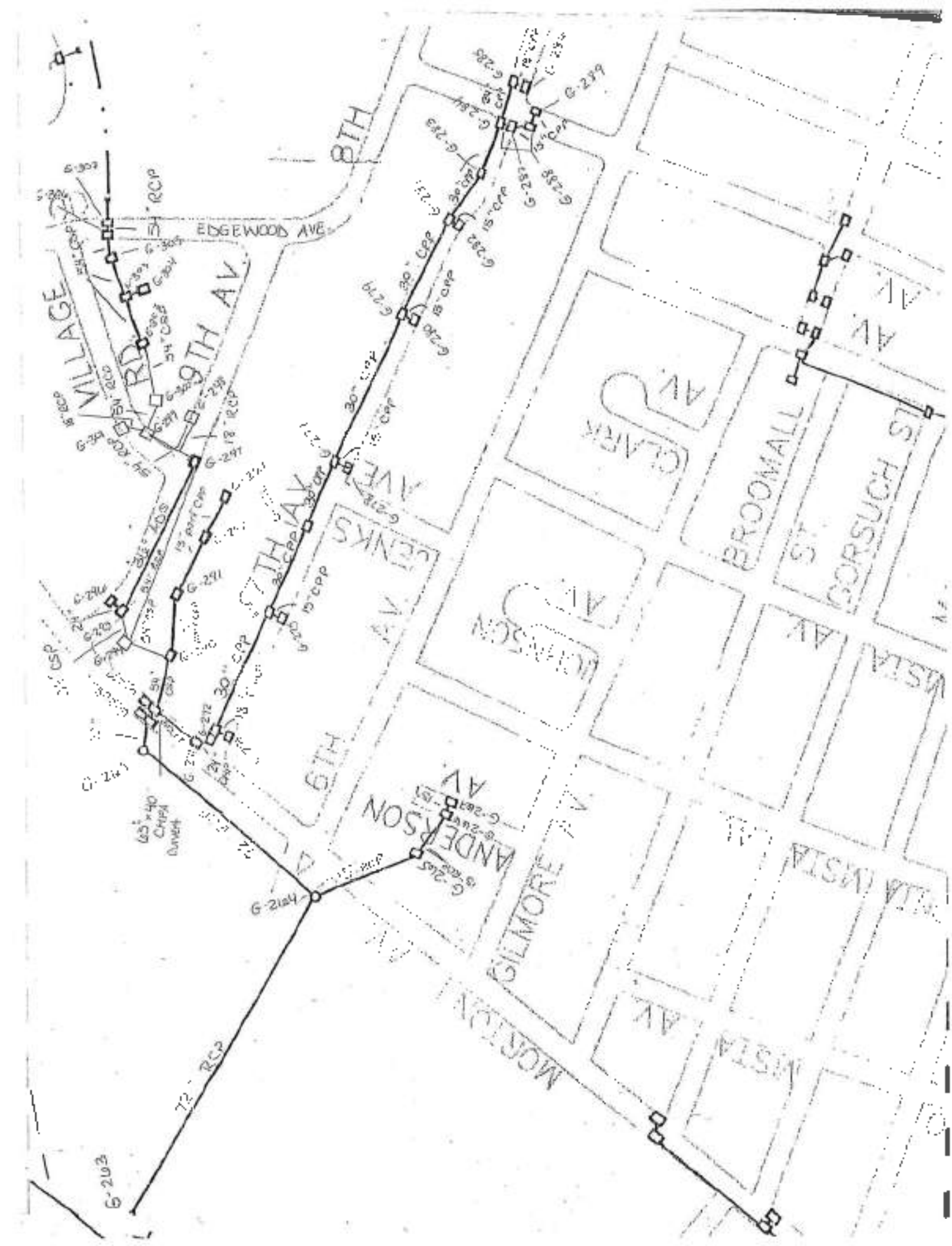

MACDADE BLVD.
MEADOW RD.
WOODCREST RD.
SCHOOLLINE
COLSON RD.
MORRIS AV.
KOSSUTH
BUCHANAN
GRANT AV.
TAYLOR AV.
WILSON AV.
TYLER AV.
GARFIELD
RAILWAY
AC-28


REESE
AV.
AV.
AV.
AV.
ARLINGTON
HAVERFORD RD.
VIRGINIA
G-6
15" RCP
15" RCP
G-5
G-3
15" RCP
G-4
18" RCP
G-2
G-1
LCC-1
18" CMP
CIR.


MACDADE BLVD.
MORTON AVE.
5'x5' R.C. Culvert
S-105
- culvert
G-107
I.CC-2
18" RCP
S
G-106
5'x5' R.C. Culvert
CSX RAILWAY


AVE
G-242
G-240
18" RCP
G-241
G-238
G-239
G-237
G-225
G-224
G-221
G-222
G-227
G-226
G-218
LCC-4
G-220
G-223
G-216
LCC-3
2-8" RCP
G-217
MOKELUMNE

MAC KINLEY
ROOSEVELT AV.
HARDING AV.
FULMER CIR.
BROOKSIDE
AV.
NALL LA.
MARION LN.
WASHINGTON AV.
24" RCP
Crum Creek
GIRARD
G-1614
G-1613
G-1612
G-1611
G-1610
G-1609
G-1608
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G-1602
G-1601
G-1600
G-1598
G-1597
G-1596


8TH
EDGEWOOD AVE
VILLAGE RD
9TH AV
7TH AV
6TH AV
CLARK
BROOMALL ST
CORSUCH ST
JENKS
ANDERSON
GILMORE
MCKINLEY
AV
ST
RCP
CMP
CSP
CPP

AV

2ND

EDGEWOOD

HAZEL

FERNWOOD

EVERGREEN

G-72

12" CPP

G-74

G-75

G-39
G-40
G-33
G-32
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G-35
G-36
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G-38
HAVERFORD RD.
WASHINGTON AV.
JACKSON AV.
G-31
G-30
G-29
G-28
G-27
G-26
G-41
G-42
G-43
G-44
G-45
15"
18"
24"
30"
36"

FORM G (3:

EXISTING STORMWATER COLLECTION SYSTEM FORM G SHEET 4 OF 67

WATERSHED

COMPILED BY

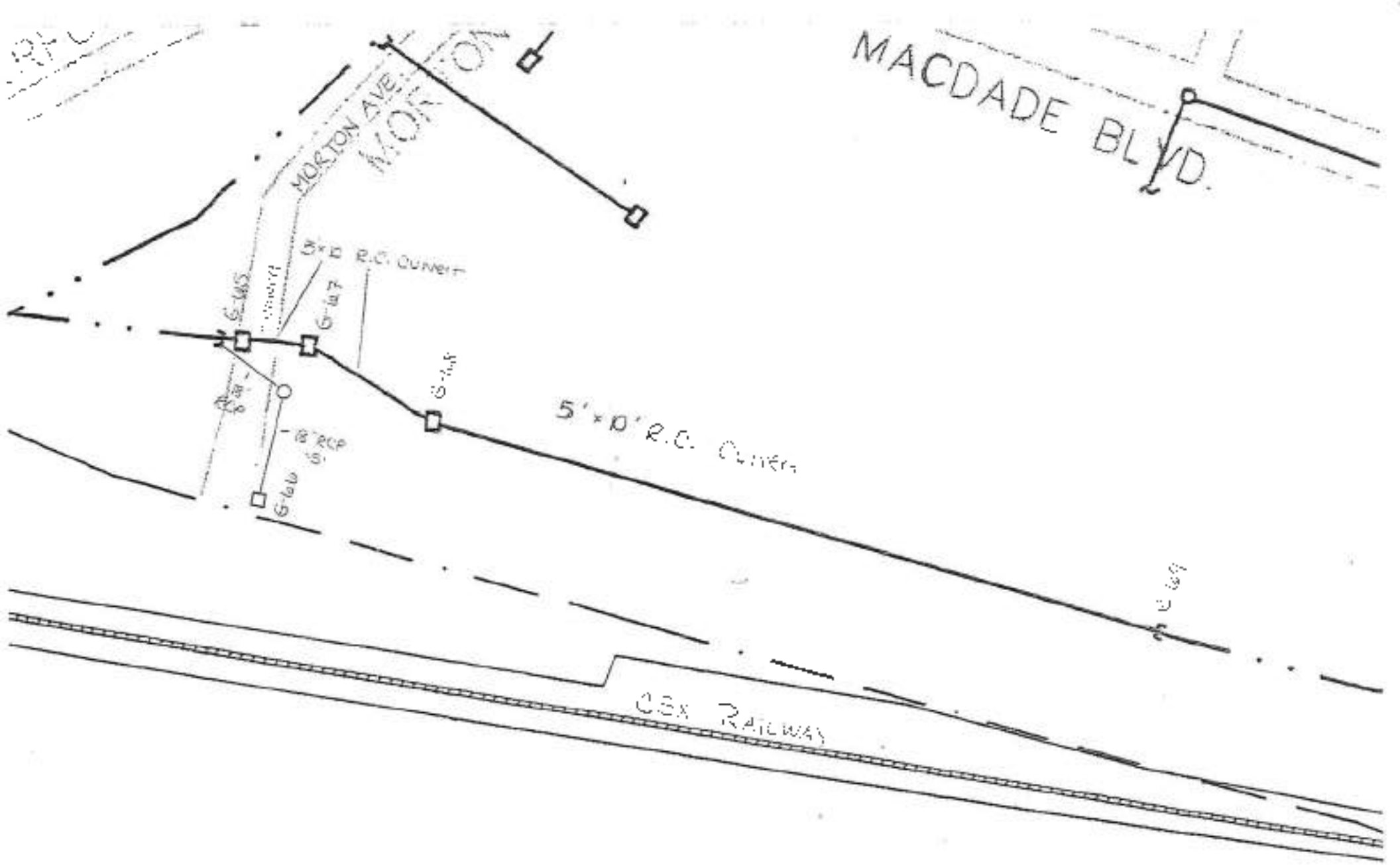
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Municipality:

INSTRUCTIONS

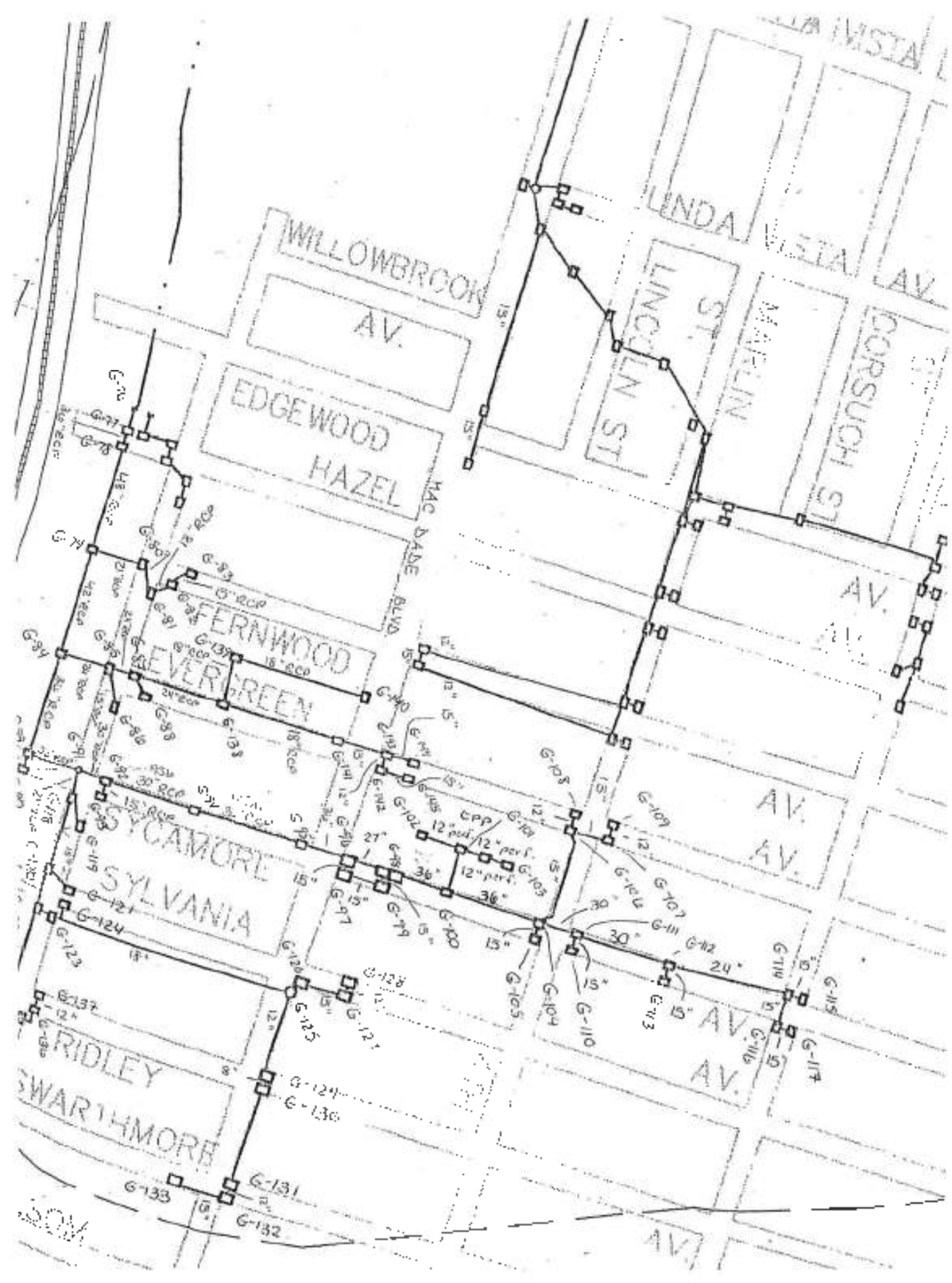
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points with each system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse

Measurements* Channel / Swale			Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
TW	B	Depth					
			RCP	c. 1951	no	Anne Howarsk 610-833-1922	Ridley Township
			RC Culvert	c. 1936	no	Anne Howarsk 610-833-1922	Ridley Township
			RC Culvert	c. 1996	no	Anne Howarsk. 610-833-1923	Ridley Township
			RC Culvert	c. 1996	no	Anne Howarsk: 610-833-1924	Ridley Township
			natural	-	no	Anne Howarsk 610-833-1925	Ridley Township
			CPP	c. 1995	no	Anne Howarski 610-833-1926	Ridley Township
			CPP	c. 1995	no	Anne Howarski 610-833-1927	Ridley Township
			CPP	c. 1995	no	Anne Howarski 610-833-1928	Ridley Township
			CPP	c. 1955	no	Anne Howarski 610-833-1929	Ridley Township
			CPP	c. 1995	no	Anne Howarski 610-833-1930	Ridley Township


MACDADE BLVD.
MORTON AVE.
MORTON
5'x10' R.C. Culvert
5'x10' R.C. Culvert
CSX RAILWAY

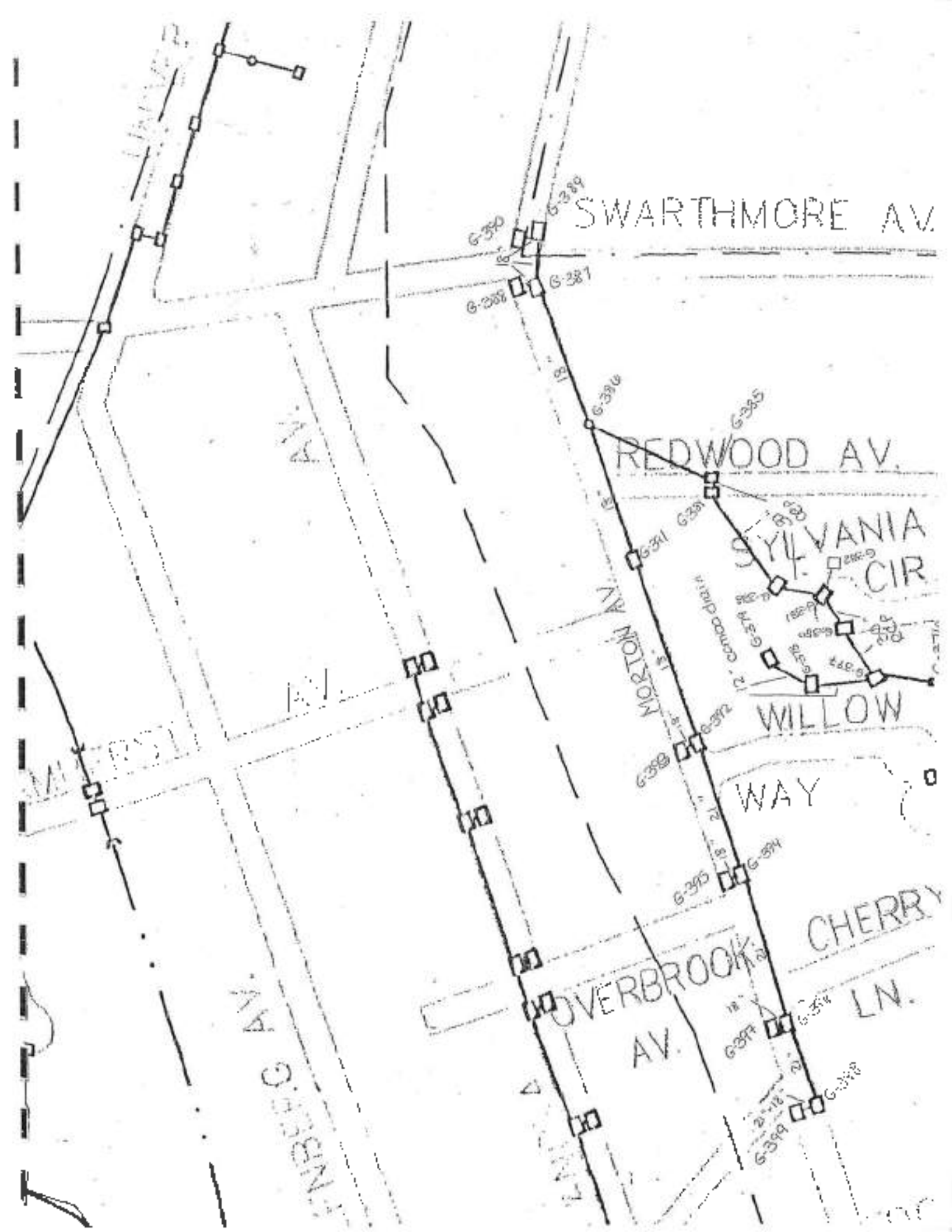
HAVERFORD RD.
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15"
18"
24"
30"
36"
12" CIP
24" TYPICAL CORR.
JACKSON AV.

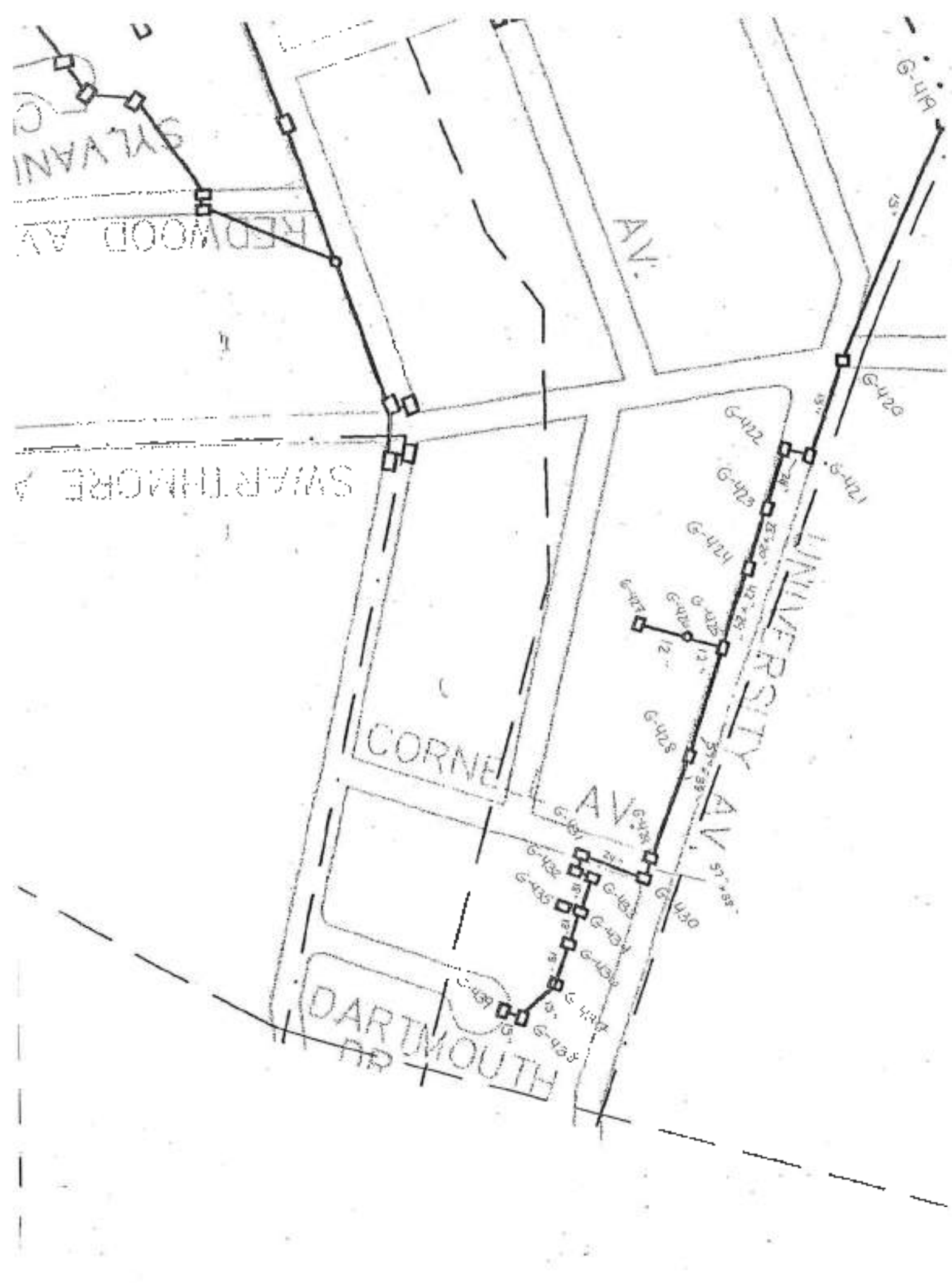
EDGEWOOD
HAZEL
FERNWOOD
EDGEWOOD
2ND
G-T3
G-T4
G-T5
G-T6
G-T7
G-T8
18" CPP
24" CPP
24" CPP


WILLOWBROOK
AV.
EDGEWOOD
HAZEL
FERNWOOD
EVERGREEN
SYCAMORE
SYLVANIA
RIDLEY
SWARTHMORE
LINDA
VISTA
AV.
ENCLEN
ST.
BORSUCH
MAPLE
HAC
DADE
BLVD
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15" RCP
18" RCP
24" RCP
30" RCP
36" RCP
12" perf.
CPP

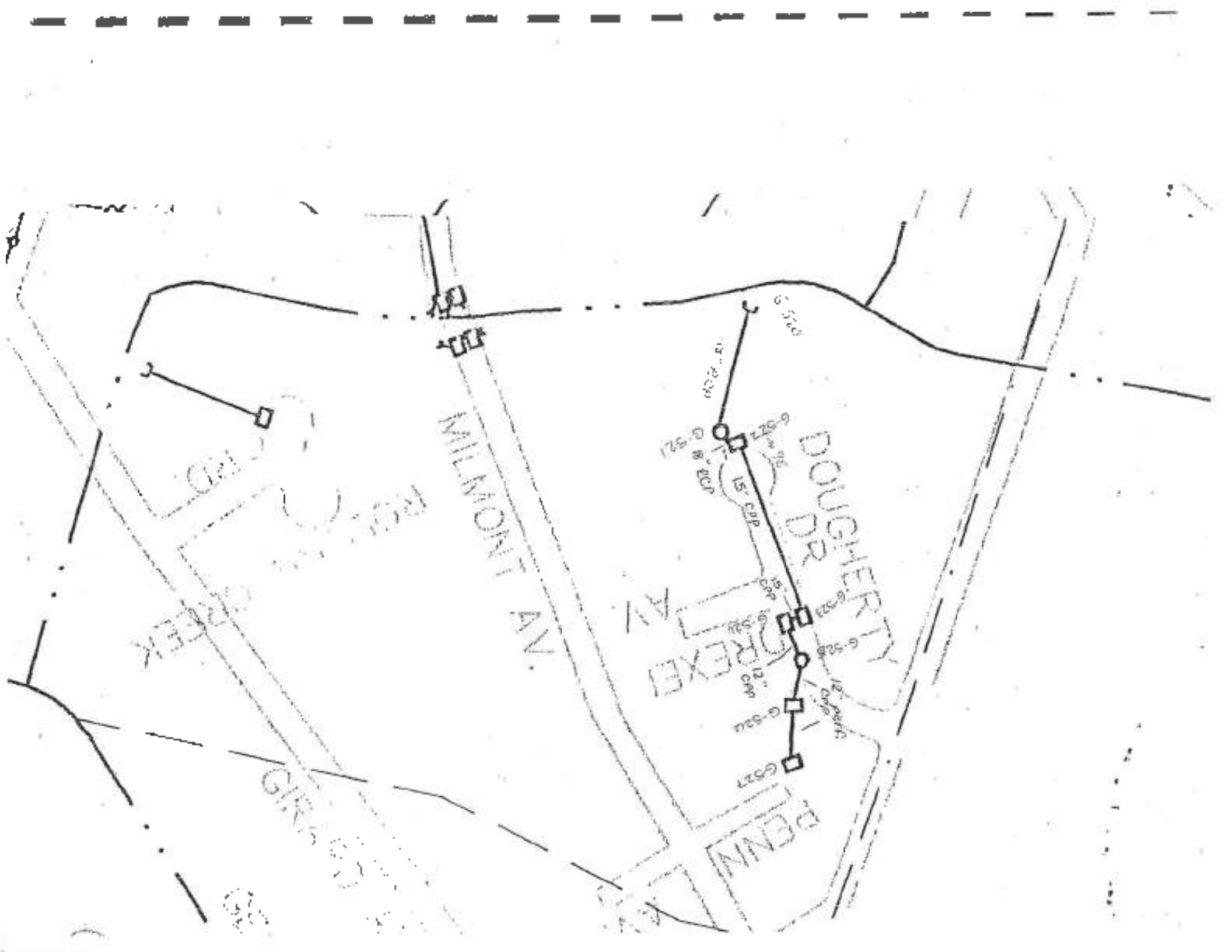
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8TH AVE
LINCOLN ST
HAZEL
FERNWOOD
24" CPP
18" CPP
15" CPP
CMPA
AV

31H
AV.
EVERGREEN AV.
CHERRY
LN.
MILLOW
AV
SYLVANIA AVE
21" RCP
9TH AV.
10TH AV.
11TH AV.
PLATT AV.
SNYDER AV.
OTH AV.
A

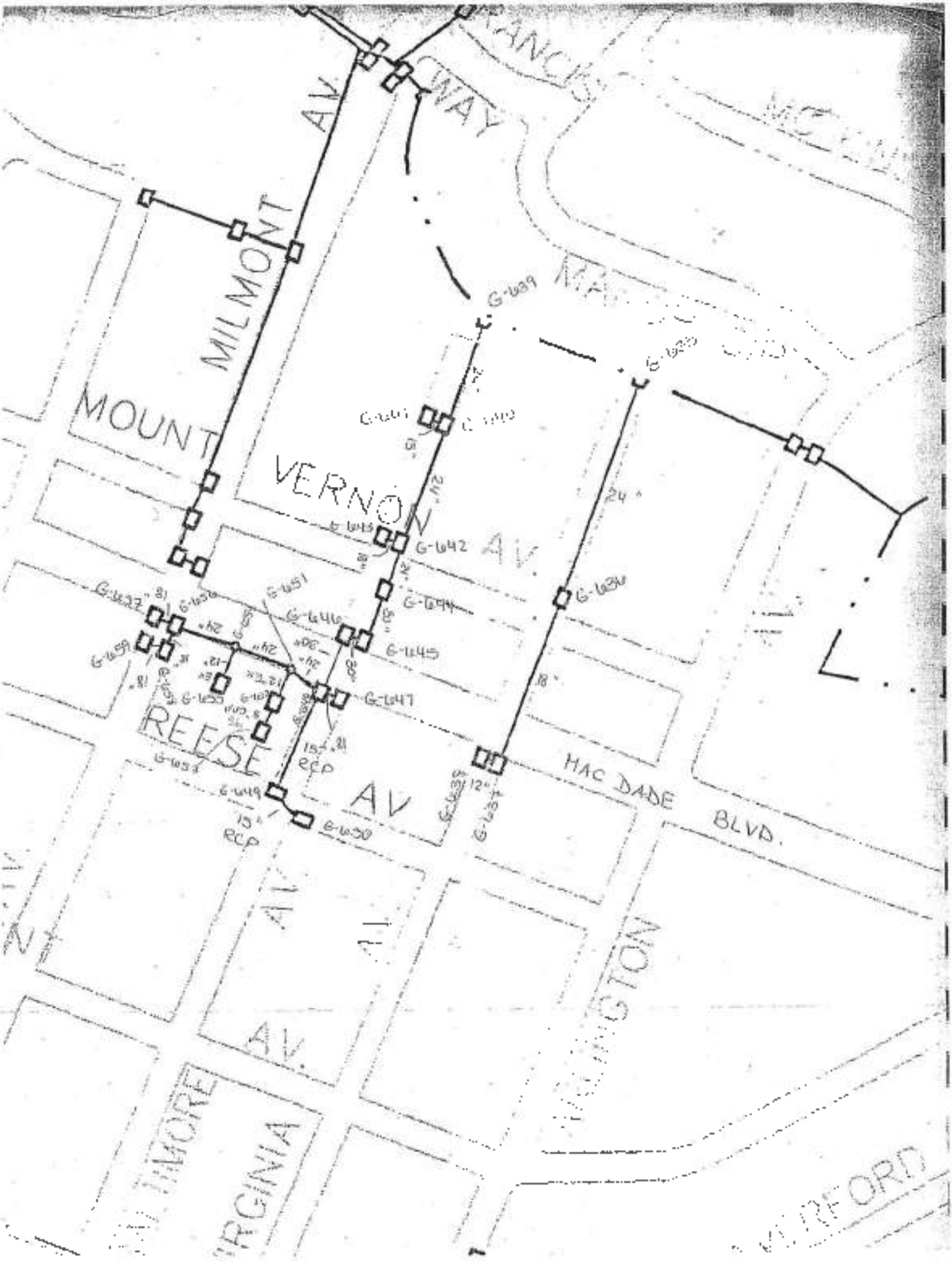

SWARTHMORE AV.
REDWOOD AV.
SYLVANIA CIR
WILLOW
WAY
MORTON AV.
OVERBROOK AV.
CHERRY
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12" Comb. Drain

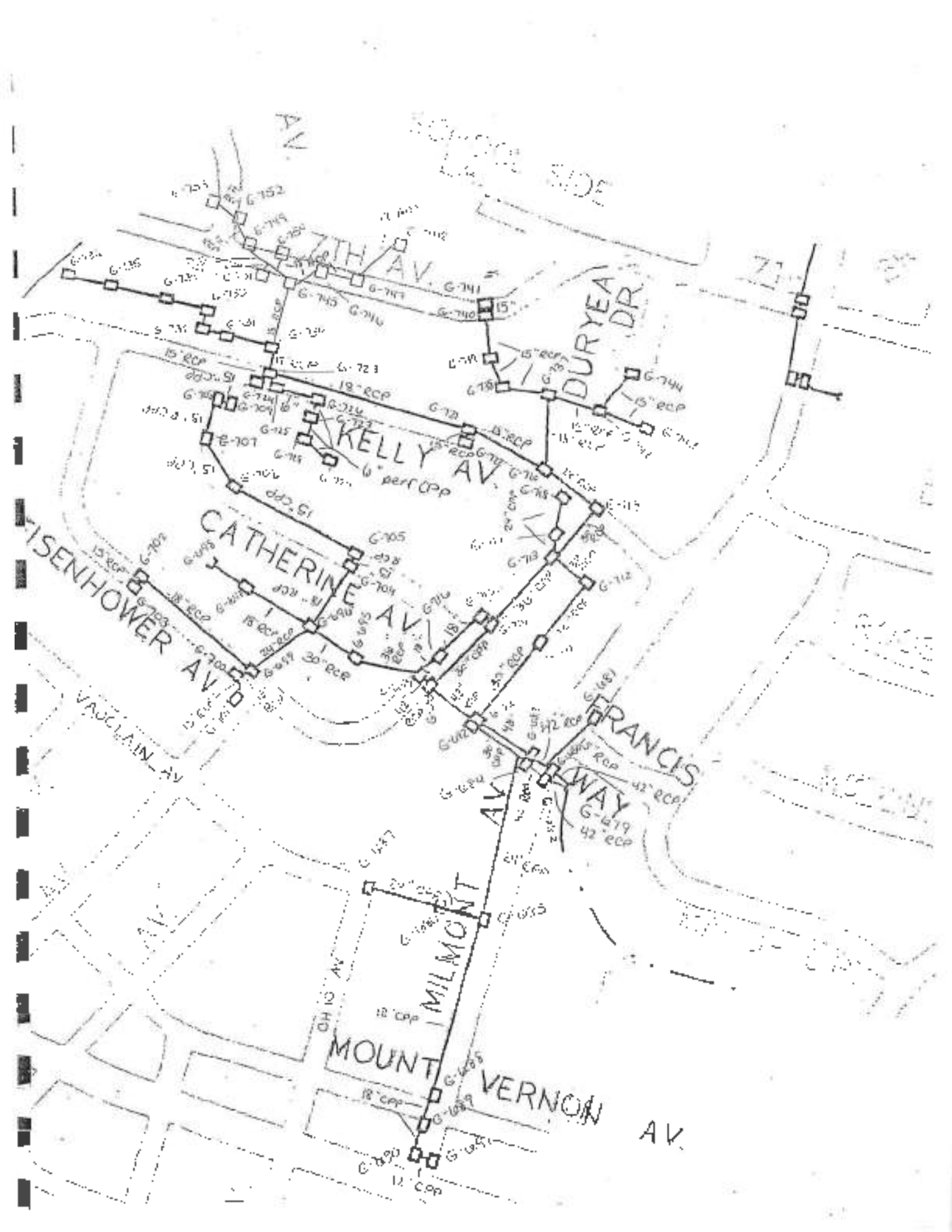

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CORNELL
AV.
DARTMOUTH
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SYLVANIA
HEDWOOD AV.
SWARTHMORE

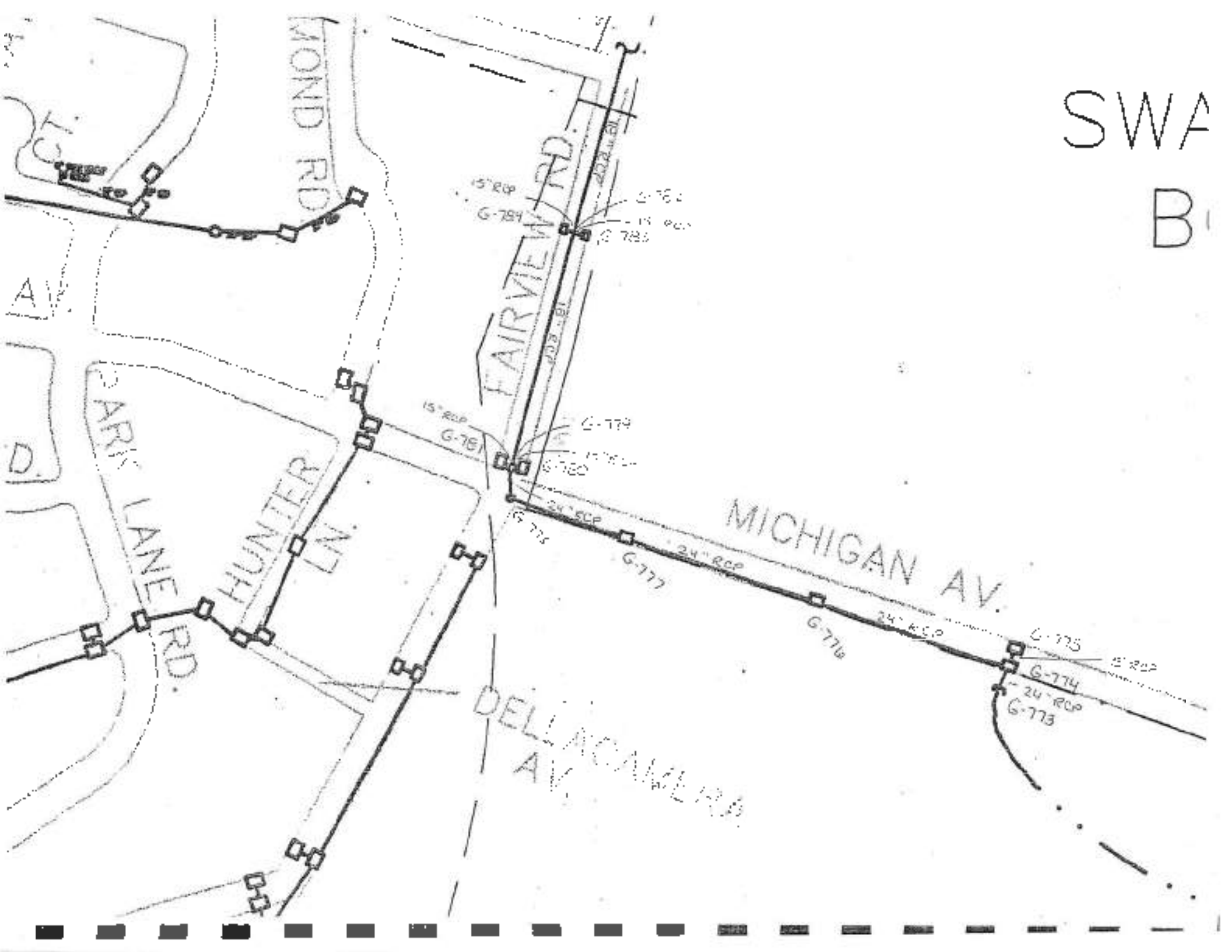
GEORGETOWN RD.
LA VILLANOVA CIR.
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18" CMP
15" CMP
12" CMP
18" CPP
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18" CRP
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186"
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204"
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216"
222"
228"
234"
240"
246"
252"
258"


WILMONT AV.
DOUGHERTY DR
EXETER
GLEN
15" CMP
12" CMP
12" CMP

BROOKSIDE AV
MILNC
G-549
G-548
G-560
15" ECP
18" ECP
G-561
G-559
G-558
G-557
G-556
G-555
G-554
G-553
G-552
G-551
G-550
G-547
24" CMP
30" RCP
18" RCP


MILMONT AV.
MOUNT VERNON AV.
REESE AV
HAC DADE BLVD.
G-639
G-642
G-644
G-645
G-647
G-649
G-650
G-651
G-634
G-637
G-638
G-639
24"
18"
15" RCP
12"


7TH AV.
DURYEA DR
KELLY AV.
CATHERINE AV.
EISENHOWER AV.
VAUCLAIN AV.
FRANCIS WAY
MILMONT AV.
MOUNT VERNON AV.
15" RCP
18" RCP
30" RCP
42" RCP
6" perf CPP
12" CPP
18" CPP


SWA
B
MOND RD.
FAIRVIEW RD.
HUNTER LN.
CARR LANE RD.
MICHIGAN AV.
DELAWARE AV.
15" RCP
G-784
G-783
G-779
G-781
G-780
24" RCP
G-777
G-776
G-775
G-774
G-773

Form O - Outfall Data

Person: J. H Bricker Date: 12/ Time Since Last Rain was > 72 Hours:

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify) /Floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
CC-1				12" RCP								
CC-2				36" RCP								
CC-3				66" RCP								
CC-4				24" RCP								
CC-5				12								
CC-6				15								
CC-7				30" RCP								
CC-8				27 RCP								
CC-9				30 RCP								

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, color, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*[1] = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: J. H. Bricker Date: 12/ Time Since Last Rain was > 72 Hours:

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (DD:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present	Describe land use of upstream drainage area	Rating (0-2)
CC-10				30" RCP								
CC-11				18" CMP								
CC-12				18" RCP								
CC-13												
CC-14				30" CMP								
CC-15				18" RCP								
CC-16				18" CMP								
CC-17				18" RCP								
CC-18				30" ARS								

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: J H Bricker Date: 12/04 Time Since Last Rain was > 72 Hours:

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No/Not sure	Time (Military) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
CC -19				15" RCP								
CC -20				15" RCP								
CC -21				42" RCP								
CC -22				30" CMP								
CC -23				30" RCP								
CC -24				24" CSP								
CC -25				24" RCP								
CC -26				15" RCP								
CC -27				30" ADS								

CC 28 12" CMP

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

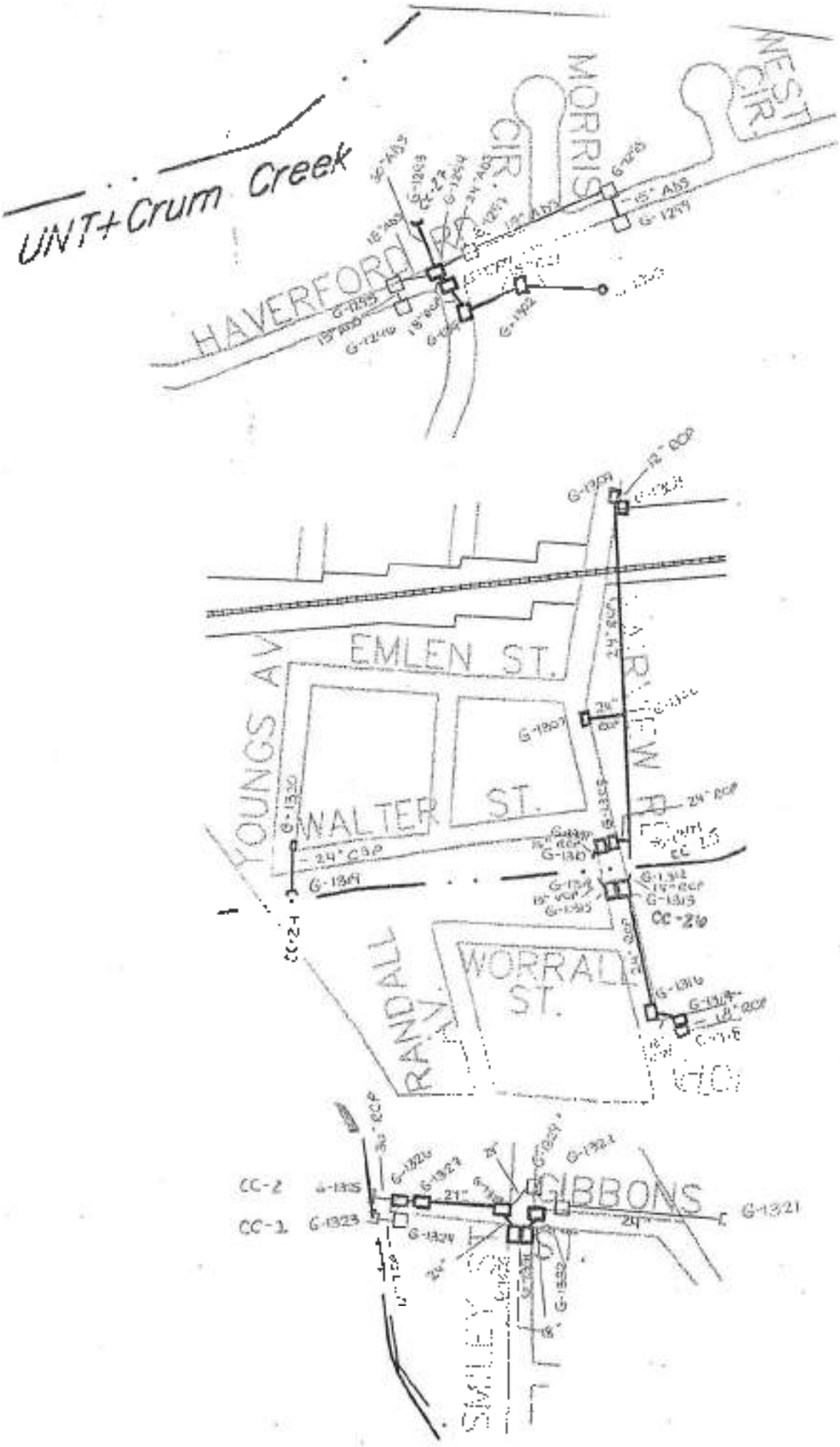
1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

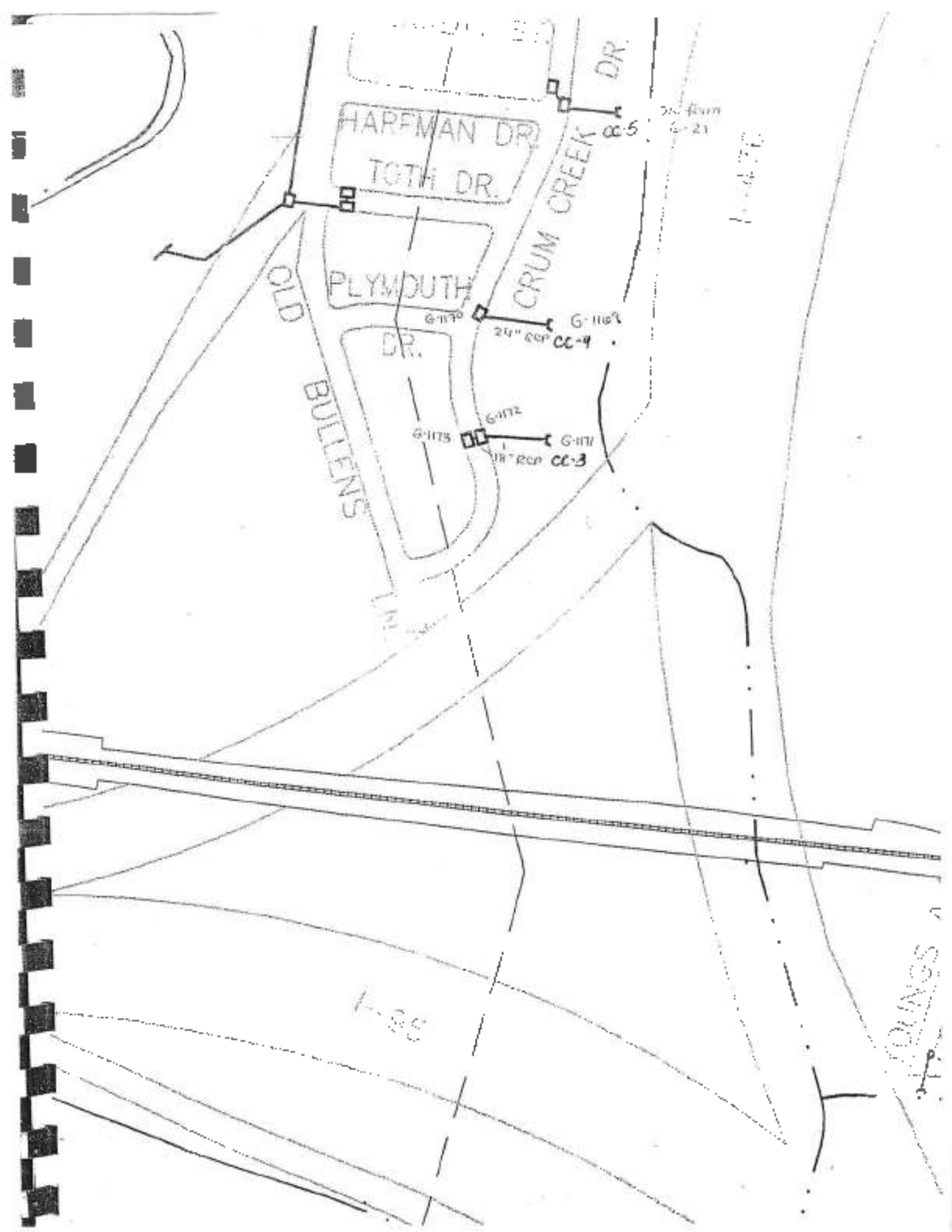
2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

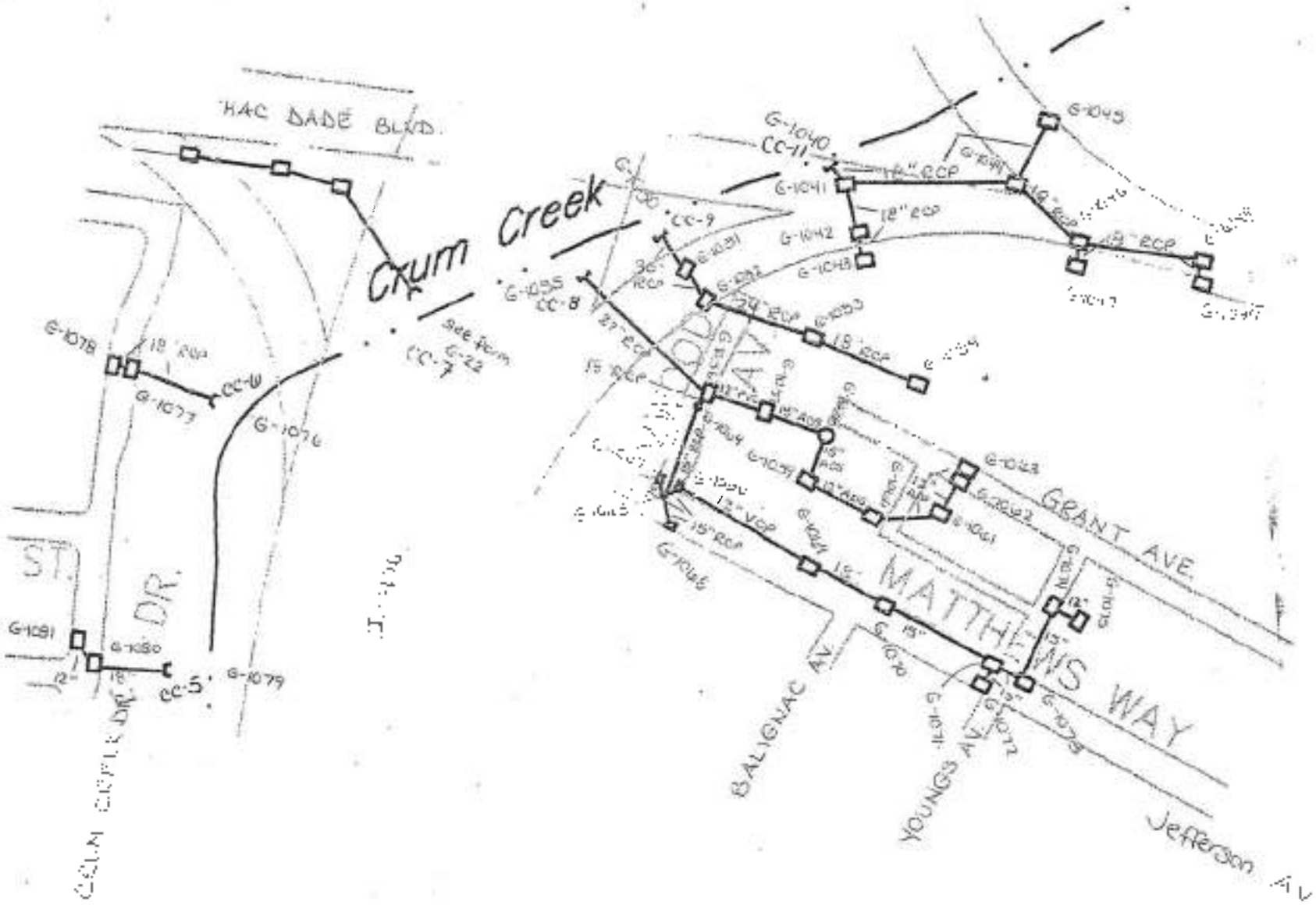
H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:


UNT to Crum Creek
HAVERFORD RD.
MORRIS CIR.
WEST CIR.
EMLEN ST.
WALTER ST.
WORRALL ST.
YOUNGS AV.
RANDALL
GIBBONS
CC-2
CC-1
CC-2b
G-1321
G-1323
G-1325


HARFMAN DR
TOTH DR.
PLYMOUTH
DR.
OLD BULLENS
CRUM CREEK DR
G-1170
G-1169
24" RCP CC-4
G-1172
G-1175
G-1171
18" RCP CC-3
CC-5
I-85


HAC BADE BLVD.
Crum Creek
CC-11
CC-9
CC-8
CC-7
CC-6
CC-5
G-1040
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G-1074
G-1075
G-1076
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G-1079
G-1080
G-1081
See form G-22
GRANT AVE.
MATTHEWS WAY
BALIGNAC AV.
YOUNGS AV.
Jefferson Av
CEDAR CREST DR.
ST.
DR.

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 5 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/9/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1 G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements'				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-76	G-77	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-77	G-78	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-78	G-79	X			48"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-79	G-80	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-80	G-81	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-81	G-82	X			18"				RCP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-82	G-83	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-79	G-84	X			42"				RCP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-84	G-85	X			24"				RCP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-85	G-86	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-85	G-87	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-87	G-88	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-87	G-138	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 3 OF 67

Map ID No.		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-138	G-139	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-139	G-140	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-138	G-141	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-141	G-143	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-143	G-142	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-143	G-144	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-142	G-145	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-84	G-89	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-89	G-90	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-89	G-91	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-91	G-92	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-92	G-93	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-92	G-94	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-94	G-95	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-95	G-96	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-96	G-97	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 7 OF 37

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Fac. Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channe	Swale	D	TW	B	Depth					
G-96	G-98	X			27"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-98	G-99	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-98	G-100	X			36"				RCP	c 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-100	G-101	X			12"				PCPP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-101	G-102	X			12"				PCPP	c 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-101	G-103	X			12"				PCPP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-100	G-104	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-104	G-105	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-104	G-106	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-106	G-107	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-107	G-109	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-108	G-108	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-104	G-111	X			30"				RCP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-111	G-110	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-111	G-112	X			30"				RCP	c 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-112	G-113	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township

FORM G (4)

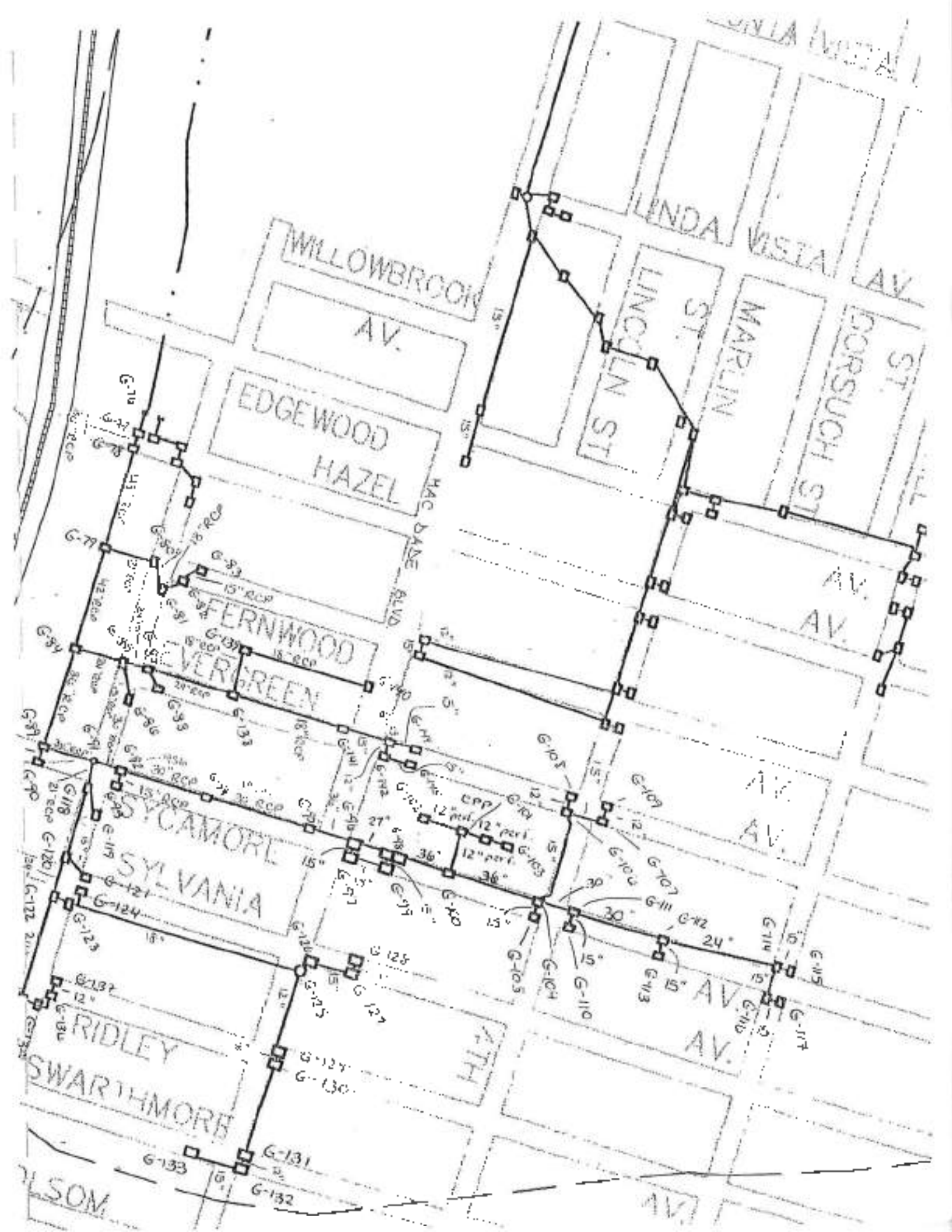
EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 8 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-112	G-114	X			24"				RCP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-114	G-115	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-114	G-116	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-116	G-117	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-91	G-118	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-118	G-119	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-118	G-120	X			24"				RCP	c. 1955	no	Anne Howanski 610 833-1928	Ridley Township
G-120	G-122	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-120	G-121	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-122	G-123	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-123	G-125	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-125	G-126	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-126	G-127	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-127	G-128	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-125	G-129	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-129	G-130	X			8"				RCP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township

FORM G (4)

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 9 OF 67

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-130	G-131	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-131	G-132	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-132	G-133	X			15"				RCP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-122	G-134	X			24"				RCP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-134	G-135	X			18"				RCP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-135	G-136	X			18"				RCP	c. 1995	no	Anne Howanski 610-833-1932	Ridley Township
G-136	G-137	X			12"				RCP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township


WILLOWBROOK
AV.
EDGEWOOD
HAZEL
HAC
AVE
BLVD
FERNWOOD
EVERGREEN
SYCAMORE
SYLVANIA
RIDLEY
SWARTHMORE
LINDA VISTA AV.
ENCINO ST.
MARLIN
BORSUCH
ST
AV.
G-76
G-77
G-78
G-79
G-80
G-81
G-82
G-83
G-84
G-85
G-86
G-87
G-88
G-89
G-90
G-91
G-92
G-93
G-94
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G-121
G-122
G-123
G-124
G-125
G-126
G-127
G-128
G-129
G-130
G-131
G-132
G-133
G-134
G-135
G-136
G-137
G-138
15" RCP
18" RCP
24" RCP
30" RCP
36" RCP
12" pvt.
CPP

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 10 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 5/10/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements. pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-157	G-158	X			54"				CMP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-158	G-159	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-159	G-160	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-160	G-161	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-161	G-162	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-158	G-163	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-163	G-164	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-164	G-165	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-165	G-166	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-166	G-167	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-167	G-168	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-168	G-169	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-169	G-170	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township

FORM G (5)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 11 OF 87

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-170	G-171	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-171	G-172	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-171	G-173	X			15"x21"				CMPA	c. 1993	no	Anne Howanski 610-833-1925	Ridley Township
G-173	G-193	X			15"x21"				CMPA	c. 1993	no	Anne Howanski 610-833-1926	Ridley Township
G-193	G-174	X			15"x21"				CMPA	c. 1993	no	Anne Howanski 610-833-1927	Ridley Township
G-174	G-175	X			13"x17"				CMPA	c. 1993	no	Anne Howanski 610-833-1928	Ridley Township
G-174	G-176	X			13"x17"				CMPA	c. 1993	no	Anne Howanski 610-833-1929	Ridley Township
G-176	G-177	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-176	G-178	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-175	G-179	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-179	G-180	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-180	G-181	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-180	G-182	X			13"x17"				CMPA	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-169	G-183	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-183	G-184	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-183	G-185	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township

FORM G (5)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 12 OF 87

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-185	G-186	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-185	G-187	X			24"				CPP	c 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-187	G-188	X			15"				CPP	c 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-187	G-189	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-189	G-190	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-189	G-191	X			18"				CPP	c 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-191	G-192	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-192	G-193	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-193	G-194	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-189	G-195	X			12"				RCP	c 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-195	G-196	X			15"				RCP	c 1955	no	Anne Howanski 610-833-1927	Ridley Township

BROOMALL
MARLIN
LINCOLN ST
G-191
G-189
G-182
G-181
G-180
G-179
G-177
G-176
G-175
G-174
G-173
G-172
G-171
G-170
G-169
G-168
G-167
G-166
G-165
G-164
G-163
G-162
G-161
G-160
G-159
G-158
G-157
24" CMP
18" CMP
15" CMP
12" CMP
FERNWOOD

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 13 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2684
Date: 8/10/2004

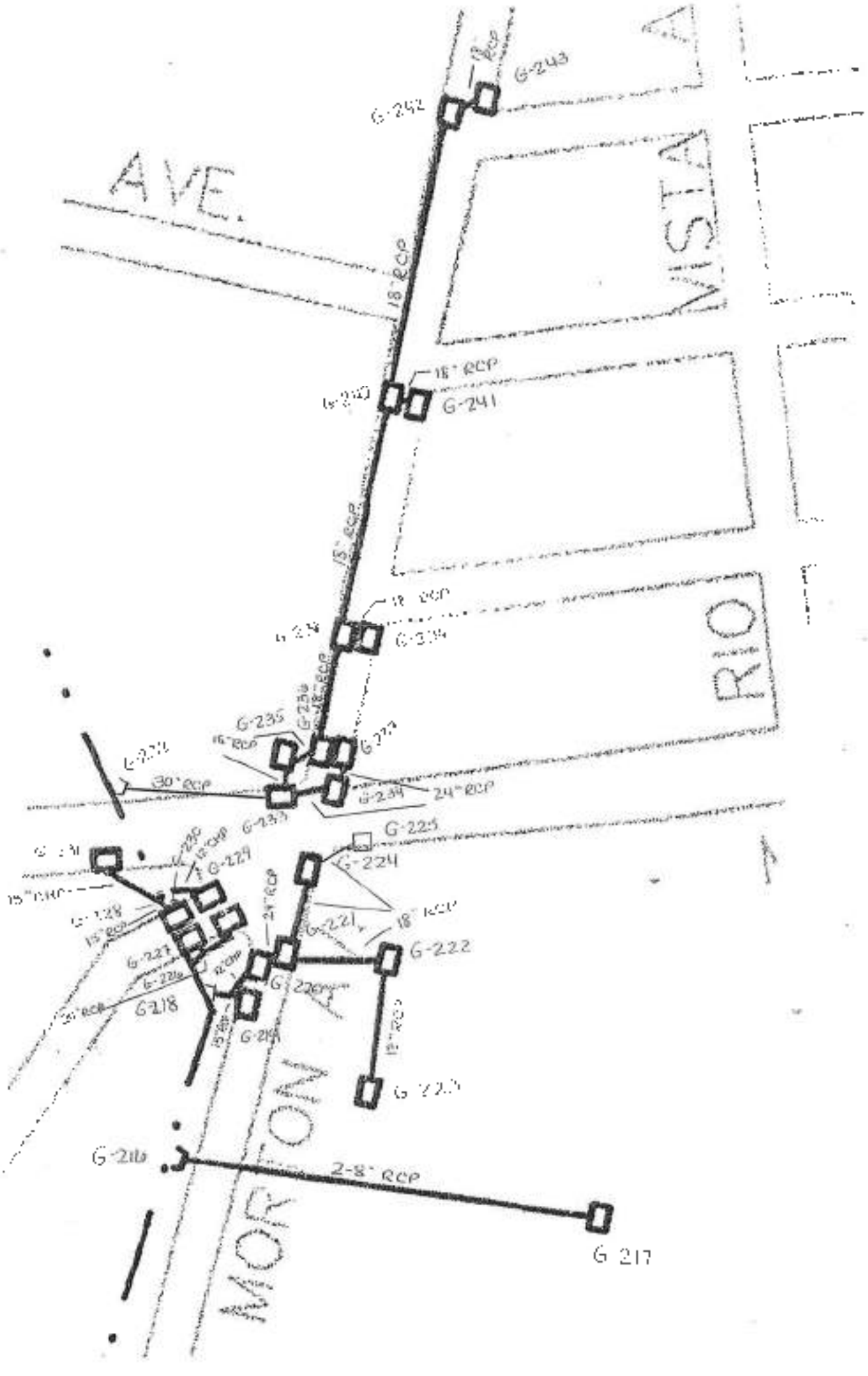
INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-20 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-216	G-217	X			2-8'				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-218	G-219	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-218	G220	X			12"				CMP	c. 1950	no	Anne Howanski 610-833-1923	Ridley Township
G-220	G-221	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1924	Ridley Township
G-221	G-222	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1925	Ridley Township
G-222	G-223	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1926	Ridley Township
G-221	G-224	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1927	Ridley Township
G-224	G-225	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1928	Ridley Township
G-226	G-227	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township
G-228	G-229	X			12"				CMP	c. 1950	no	Anne Howanski 610-833-1930	Ridley Township
G-228	G-230	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1931	Ridley Township
G-230	G-231	X			15"				CMP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-232	G-233	X			30"				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 14 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channe	Swale	D	TW	B	Depth					
G-233	G234	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1923	Ridley Township
G-234	G-237	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1924	Ridley Township
G-233	G-235	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1925	Ridley Township
G-235	G-236	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1926	Ridley Township
G-236	G-238	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1927	Ridley Township
G-238	G-239	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1928	Ridley Township
G-238	G-240	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township
G-240	G-241	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1930	Ridley Township
G-240	G-242	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1931	Ridley Township
G-242	G-243	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1932	Ridley Township


AVE.
G-243
G-242
18" RCP
G-241
G-240
15" RCP
G-239
G-238
G-235
G-236
G-237
G-234
24" RCP
30" RCP
G-233
G-231
G-225
G-224
G-229
G-228
G-227
G-226
G-222
G-221
G-220
G-218
G-219
G-216
2-8" RCP
G-217
MOUNTAIN

FORM G (7)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 15 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2864
Date: 8/10/2004

INSTRUCTIONS

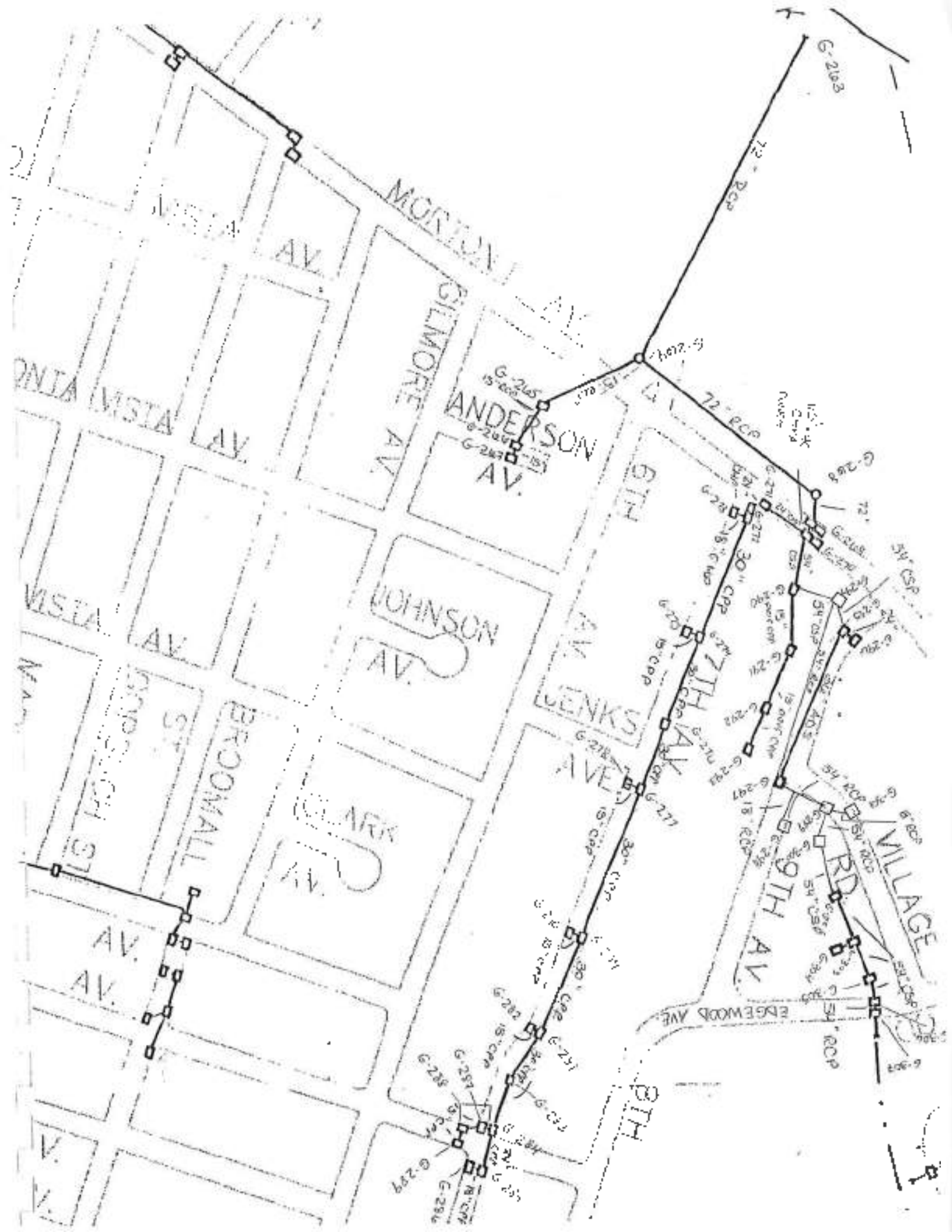
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Oper Channel	Swale	ID	TW	B	Depth					
G-263	G-264	X			72"				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-264	G-265	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-265	G-266	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1923	Ridley Township
G-266	G-267	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1924	Ridley Township
G-264	G-268	X			72"				RCP	c. 1950	no	Anne Howanski 610-833-1925	Ridley Township
G-268	G-269	X			72"				RCP	c. 1950	no	Anne Howanski 610-833-1926	Ridley Township
G-269	G-270	X			65"x40"				CMPA	c. 1950	no	Anne Howanski 610-833-1927	Ridley Township
G-270	G-271	X			24"				CMP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-271	G-272	X			24"				CMP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-272	G-273	X			18"				CMP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-272	G-274	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-274	G-275	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1932	Ridley Township
G-274	G-276	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 15 OF 67

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-276	G-277	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-277	G-278	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-277	G-279	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-279	G-280	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-279	G-281	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-281	G-282	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-281	G-283	X			30"				CPP	c. 1995	no	Anne Howanski 610 833-1927	Ridley Township
G-283	G-284	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-284	G-285	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-285	G-286	X			18"				CPP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-284	G-287	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-287	G-288	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1932	Ridley Township
G-288	G-289	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-270	G-290	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1922	Ridley Township
G-290	G-291	X			15"				PCPP	c. 1993	no	Anne Howanski 610-833-1922	Ridley Township
G-291	G-292	X			15"				PCPP	c. 1993	no	Anne Howanski 610-833-1923	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G													SHEET 17 OF 37
Map ID No.		System's Elements (x)			Measurements'				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-292	G-293	X			15"				PCPP	c. 1993	no	Anne Howanski 610-833-1924	Ridley Township
G-290	G-294	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1925	Ridley Township
G-294	G-295	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1926	Ridley Township
G-295	G-296	X			24"				CSP	c. 1993	no	Anne Howanski 610-833-1927	Ridley Township
G-295	G-297	X			36"				ADS	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-294	G-297	X			54"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township
G-297	G-298	X			54"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township
G-297	G-298	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1930	Ridley Township
G-299	G-301	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1931	Ridley Township
G-299	G-300	X			54"				RCP	c. 1950	no	Anne Howanski 610-833-1932	Ridley Township
G-300	G-302	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1933	Ridley Township
G-302	G-303	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1922	Ridley Township
G-303	G-304	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1923	Ridley Township
G-303	G-305	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1924	Ridley Township
G-305	G-306	X			54"				CSP	c. 1993	no	Anne Howanski 610-833-1925	Ridley Township
G-306	G-307	X			54"				RCP	c. 1950	no	Anne Howanski 610-833-1926	Ridley Township


MORENA
AV.
GILMORE
AV.
ANDERSON
AV.
JOHNSON
AV.
CLARK
AV.
BACOMAT
AV.
BENKS
AVE.
72" RCP
30" CMP
54" CSP
54" RCP
48" RCP
VILLAGE
RD.
ENGLEWOOD AVE
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EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 18 OF 67

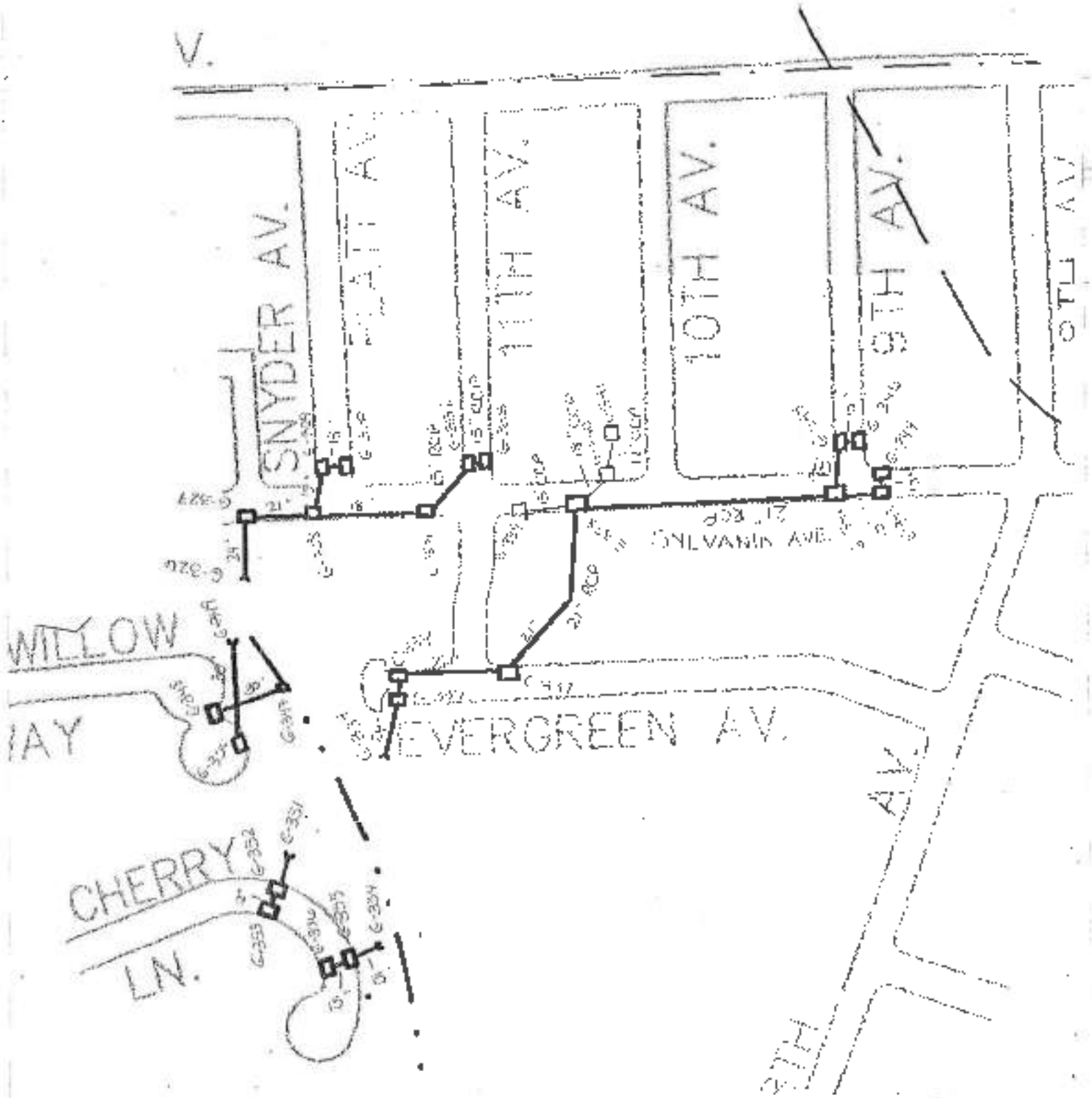
WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2684
Date: 8/10/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-326	G-327	X			24"				RCP	c. 1954	no	Anne Howanski 610-833-1933	Ridley Township
G-327	G-328	X			2[illegible]"				RCP	c. 1954	no	Anne Howanski 610-833-1922	Ridley Township
G-328	G-329	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1923	Ridley Township
G-329	G-330	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1924	Ridley Township
G-329	G-331	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1925	Ridley Township
G-331	G-332	X			[illegible]5"				RCP	c. 1954	no	Anne Howanski 610-833-1926	Ridley Township
G-332	G-333	X			[illegible]5"				RCP	c. 1954	no	Anne Howanski 610-833-1927	Ridley Township
G-334	G-335	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-335	G-336	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-336	G-337	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-337	G-338	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-338	G-339	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1932	Ridley Township
G-338	G-340	X			18"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G.													SHEET 19 OF 67
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-340	G-341	X			12"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-338	G-342	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-342	G-343	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-342	G-344	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-342	G-345	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-345	G-346	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-347	G-348	X			30"				RCP	c. 1965	no	Anne Howanski 610-833-1927	Ridley Township
G-349	G-350	X			30"				RCP	c. 1965	no	Anne Howanski 610-833-1928	Ridley Township
G-351	G-352	X			12"				RCP	c. 1985	no	Anne Howanski 610-833-1929	Ridley Township
G-352	G-353	X			12"				RCP	c. 1985	no	Anne Howanski 610-833-1930	Ridley Township
G-354	G-355	X			15"				RCP	c. 1965	no	Anne Howanski 610-833-1931	Ridley Township
G-355	G-356	X			15"				RCP	c. 1985	no	Anne Howanski 610-833-1932	Ridley Township

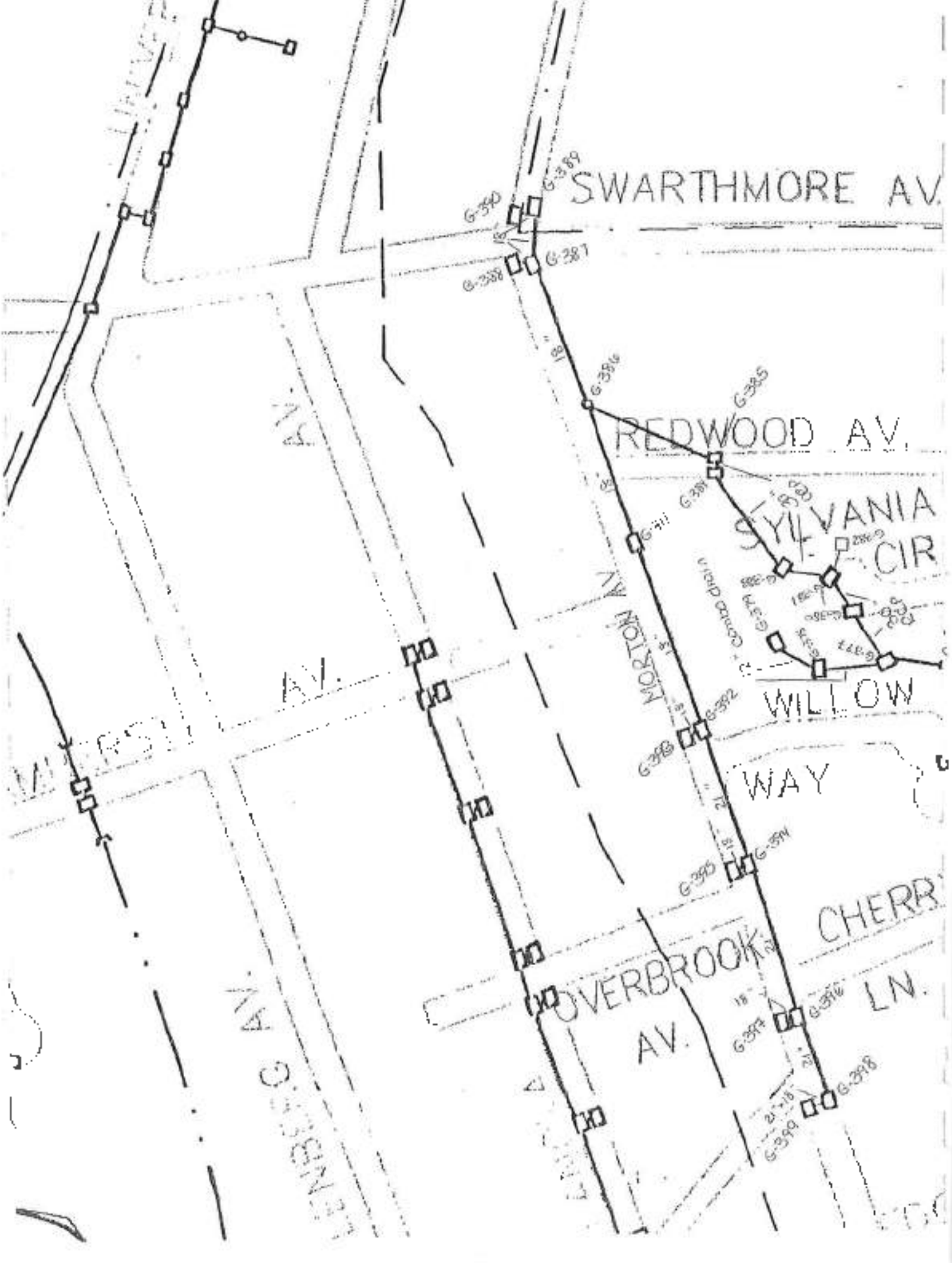

SNYDER AV.
10TH AV.
9TH AV.
SYLVANUS AVE.
EVERGREEN AV.
CHERRY
LN.

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 20 OF 57

WATERSHED		FORM COMPLETED BY		INSTRUCTIONS
Name:	Crum Creek	Name	Jamie H. Bricker	Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.
Municipality	Ridley Township	Telephone:	610-532-2884	
County:	Delaware	Date:	8/11/2004	

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-376	G-377	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-377	G-378	X			12"				combo drain	c. 1995	no	Anne Howanski 610-833-1922	Ridley Township
G-378	G-379	X			12"				combo drain	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-377	G-380	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-380	G-381	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-381	G-382	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-381	G-383	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township
G-383	G-384	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1928	Ridley Township
G-384	G-385	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1929	Ridley Township
G-385	G-386	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-386	G-387	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-387	G-388	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-387	G-389	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM C.													SHEET 21 OF 67
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-389	G-390	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-390	G-391	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-391	G-392	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-392	G-393	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-392	G-394	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-394	G-395	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-394	G-396	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-395	G-397	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-396	G-398	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-398	G-399	X			21"x15"				CMPA	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township


SWARTHMORE AV.
REDWOOD AV.
SYLVANIA CIR
WILLOW
WAY
MORTON AV
OVERBROOK AV.
CHERR
LN.
G-389
G-390
G-387
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G-399

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 22 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Brooker
Telephone: 610-532-2884
Date: 8/17/2004

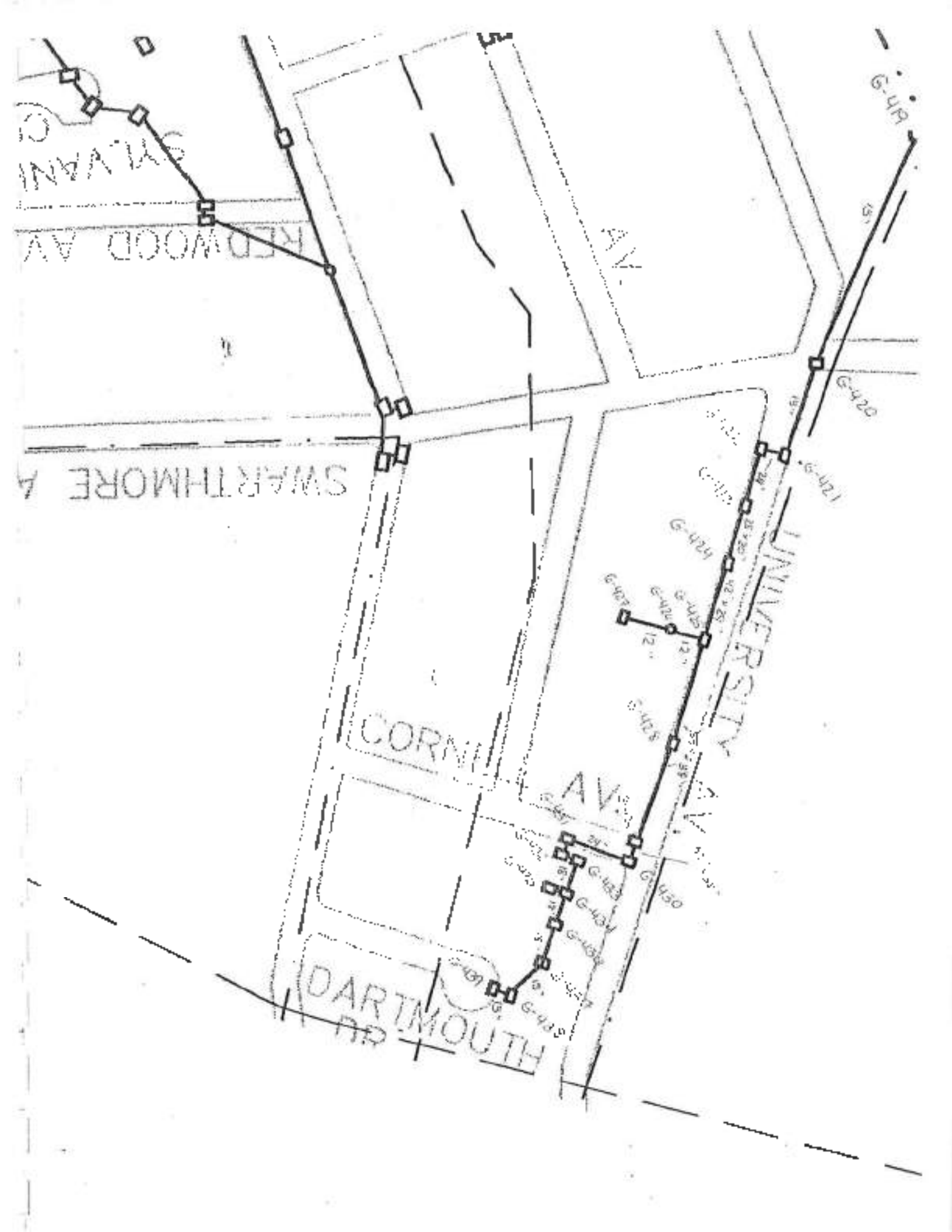
INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-419	G-420	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1923	Ridley Township
G-420	G-421	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1922	Ridley Township
G-421	G-422	X			24"				RCP	c. 1953	no	Anne Howanski 610-833-1923	Ridley Township
G-422	G-423	X			24"				RCP	c. 1953	no	Anne Howanski 610-833-1924	Ridley Township
G-423	G-424	X			28"x20"				CMPA	c. 1953	no	Anne Howanski 610-833-1925	Ridley Township
G-424	G-425	X			42"x29"				CMPA	c. 1953	no	Anne Howanski 610-833-1926	Ridley Township
G-425	G-426	X			12"				RCP	c. 1953	no	Anne Howanski 610-833-1927	Ridley Township
G-426	G-427	X			12"				RCP	c. 1953	no	Anne Howanski 610-833-1928	Ridley Township
G-425	G-428	X			57"x38"				CMPA	c. 1953	no	Anne Howanski 610-833-1929	Ridley Township
G-428	G-429	X			57"x38"				CMPA	c. 1953	no	Anne Howanski 610-833-1930	Ridley Township
G-429	G-430	X			57"x38"				CMPA	c. 1953	no	Anne Howanski 610-833-1931	Ridley Township
G-430	G-431	X			24"				RCP	c. 1953	no	Anne Howanski 610-833-1931	Ridley Township
G-431	G-432	X			24"				RCP	c. 1953	no	Anne Howanski 610-833-1932	Ridley Township

FORM G (10)

EXISTING STORMWATER COLLECTION SYSTEM FORM G.													SHEET 23 OF 67
Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-432	G-433	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1933	Ridley Township
G-433	G-434	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1922	Ridley Township
G-434	G-435	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1923	Ridley Township
G-434	G-436	X			18"				RCP	c. 1953	no	Anne Howansk 610-833-1924	Ridley Township
G-436	G-437	X			18"				RCP	c. 1953	no	Anne Howansk 610-833-1925	Ridley Township
G-437	G-438	X			15"				RCP	c. 1953	no	Anne Howansk 610-833-1926	Ridley Township
G-438	G-439	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1927	Ridley Township


G-418
G-420
G-421
G-424
G-425
G-430
G-431
G-432
G-433
G-434
G-435
G-436
G-437
G-438
G-439
G-440
G-441
G-442
G-443
G-444
G-445
G-446
G-447
G-448
G-449
G-450
UNIVERSITY
AV.
CORNELL
AV.
DARTMOUTH
PL.
SWARTHMORE
REDWOOD AV.
SYLVANIA

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 24 OF 57

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2664
Date: 8/11/2004

INSTRUCTIONS

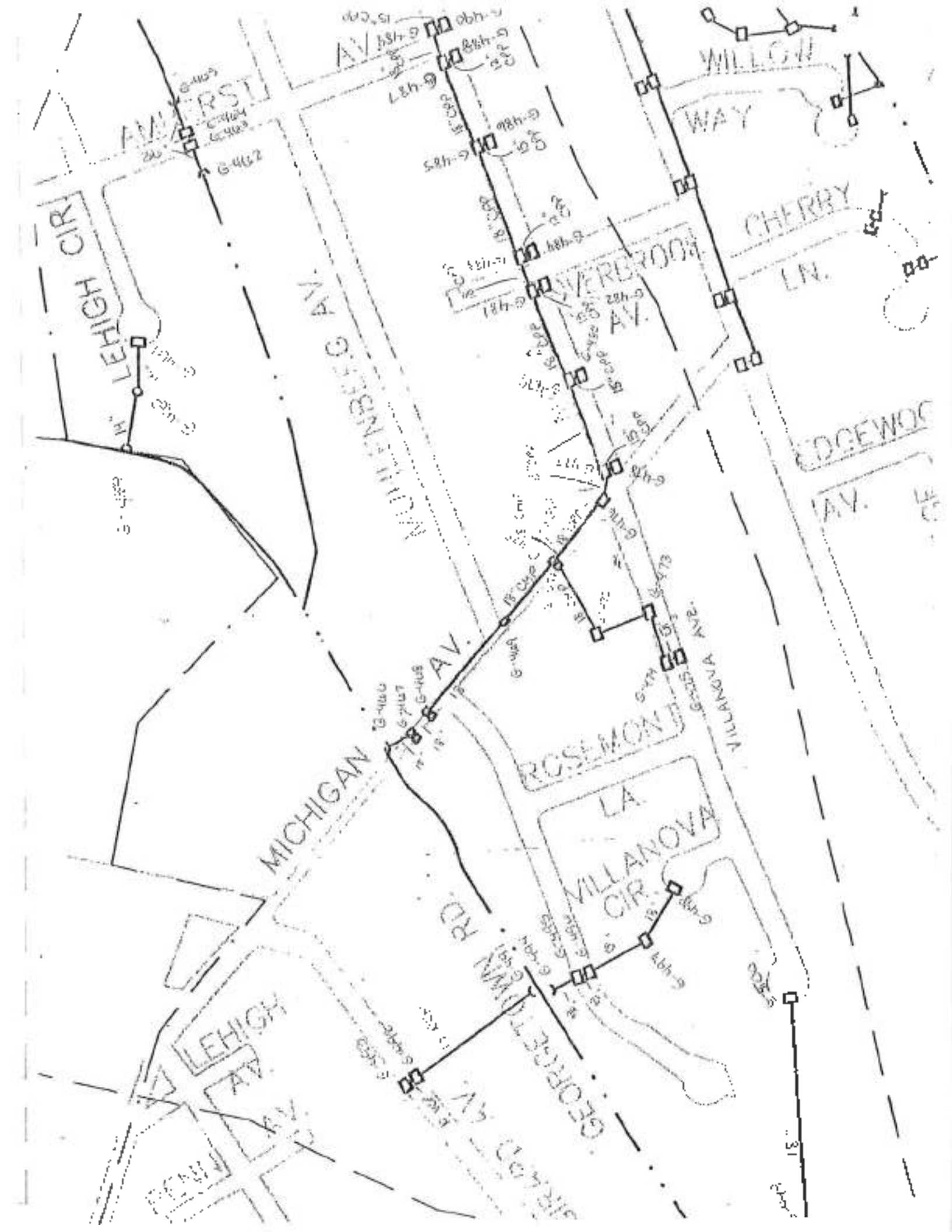
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-459	G-460	X			14"				RCP	c. 1956	no	Anne Howanski 610-833-1933	Ridley Township
G-460	G-461	X			24"				RCP	c. 1956	no	Anne Howanski 610-833-1922	Ridley Township
G-462	G-463	X			36"				RCP	c. 1957	no	Anne Howanski 610-833-1923	Ridley Township
G-463	G-464	X			36"				RCP	c. 1957	no	Anne Howanski 610-833-1924	Ridley Township
G-464	G-465	X			36"				RCP	c. 1957	no	Anne Howanski 610-833-1925	Ridley Township
G-466	G-467	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1926	Ridley Township
G-467	G-467	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1927	Ridley Township
G-468	G-469	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1928	Ridley Township
G-469	G-470	X			18"				CMP	c. 1957	no	Anne Howanski 610-833-1929	Ridley Township
G-470	G-471	X			18"				CMP	c. 1957	no	Anne Howanski 610-833-1930	Ridley Township
G-471	G-472	X			18"				CMP	c. 1951	no	Anne Howanski 610-833-1931	Ridley Township
G-472	G-473	X			18"				RCP	c. 1951	no	Anne Howanski 610-833-1932	Ridley Township
G-473	G-474	X			15"				RCP	c. 1951	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 25 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-474	G-475	X			15"				RCP	c. 1951	no	Anne Howanski 610-833-1933	Ridley Township
G-470	G-476	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1922	Ridley Township
G-476	G-477	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1923	Ridley Township
G-477	G-478	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1924	Ridley Township
G-477	G-479	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1925	Ridley Township
G-479	G-480	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1926	Ridley Township
G-479	G-481	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1927	Ridley Township
G-481	G-482	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1928	Ridley Township
G-451	G-483	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1929	Ridley Township
G-483	G-484	X			12"				CPP	c. 1996	no	Anne Howanski 610-833-1930	Ridley Township
G-483	G-485	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1931	Ridley Township
G-485	G-486	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1932	Ridley Township
G-485	G-487	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1933	Ridley Township
G-487	G-488	X			12"				CPP	c. 1996	no	Anne Howanski 610-833-1933	Ridley Township
G-487	G-489	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1922	Ridley Township
G-489	G-490	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1923	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G.													SHEET 26 OF 67
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-491	G-492	X			15"				RCP	c. 1961	no	Anne Howanski 610-833-1924	Ridley Township
G-492	G-493	X			"0"				VCP	c. 1961	no	Anne Howanski 610-833-1925	Ridley Township
G-494	G-495	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1926	Ridley Township
G-495	G-496	X			21"				RCP	c. 1957	no	Anne Howanski 610-833-1927	Ridley Township
G-496	G-497	X			"5"				RCP	c. 1957	no	Anne Howanski 610-833-1928	Ridley Township
G-497	G-498	X			"8"				RCP	c. 1957	no	Anne Howanski 610-833-1929	Ridley Township
G-499	G-500	X			"8"				RCP	c. 1951	no	Anne Howanski 610-833-1930	Ridley Township


AMHERST
LEHIGH CIR
LEHIGH AV.
MICHIGAN AV.
ROSEMONT
LA VILLANOVA CIR.
VILLANOVA AV.
WILLOW WAY
CHERRY LN.
RIDGEWOOD AV.
ROSEMONT RD.

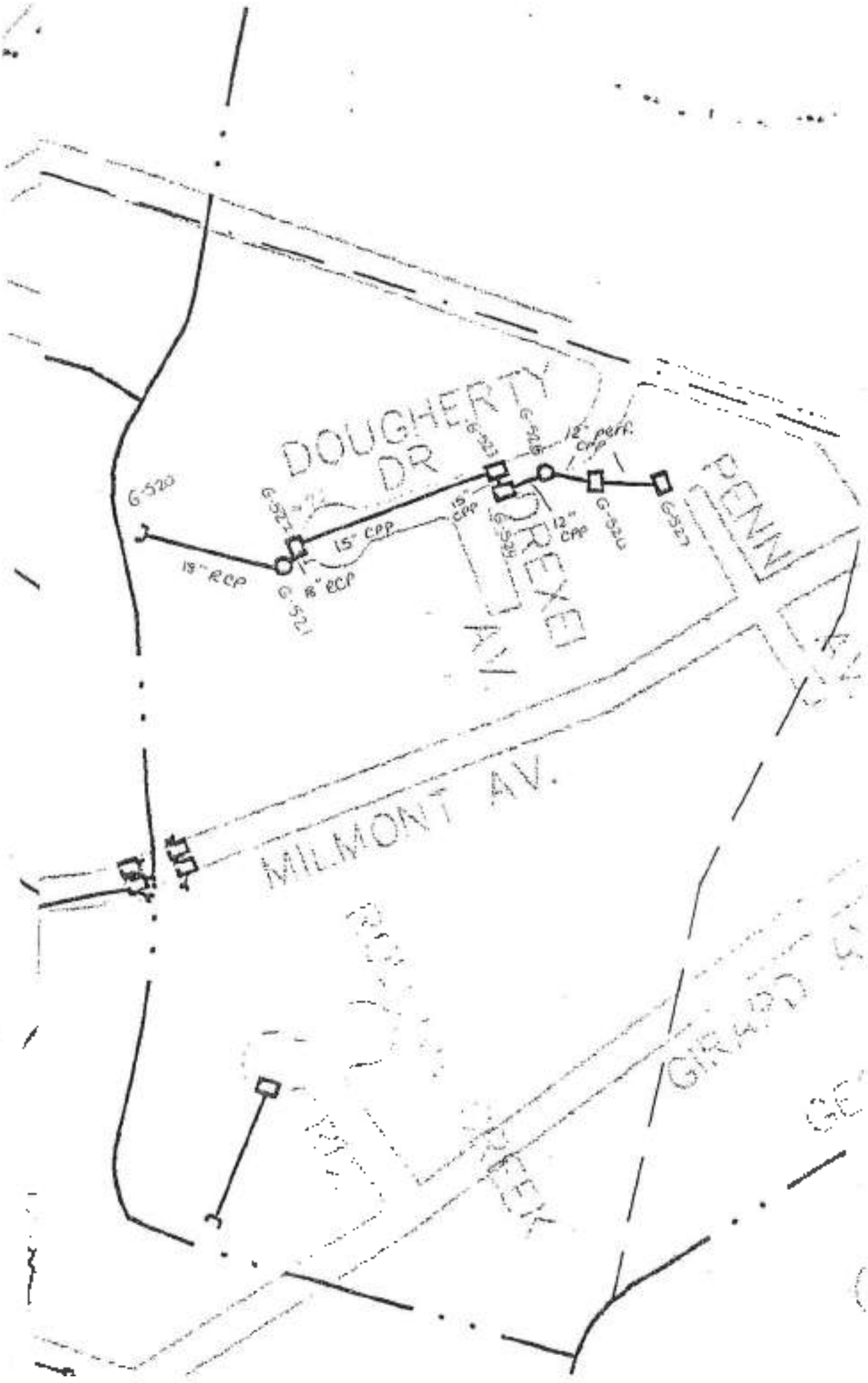
EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 27 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2984
Date: 8/11/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-5 ends one system, so G-25 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of First Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-520	G-521	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1933	Ridley Township
G-521	G-522	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1922	Ridley Township
G-522	G-523	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-523	G-524	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-524	G-525	X			12"				CPP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-525	G-526	X			12"				PCPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-526	G-527	X			12"				PCPP	c. 1995	no	Anne Howanski 610-833-1927	Ridley Township


DOUGHERTY DR
DREXEL AV
PENN
MILMON AV.
G-520
G-521
G-522
G-523
G-524
G-525
G-526
G-527
18" RCP
15" CPP
15" CPP
18" RCP
15" CPP
12" CPP
12" perf. CPP

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 28 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/12/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-547	G-548	X			36"				RCP	c. 1957	no	Anne Howanski 610-833-1933	Ridley Township
G-548	G-549	X			36"				RCP	c. 1957	no	Anne Howanski 610-833-1922	Ridley Township
G-549	G-550	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1923	Ridley Township
G-547	G-551	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1924	Ridley Township
G-551	G-552	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1925	Ridley Township
G-552	G-553	X			30"				RCP	c. 1957	no	Anne Howanski 610-833-1926	Ridley Township
G-553	G-554	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1926	Ridley Township
G-553	G-567	X			24"				CMP	c. 1957	no	Anne Howanski 610-833-1927	Ridley Township
G-554	G-555	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1928	Ridley Township
G-555	G-556	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1929	Ridley Township
G-556	G-557	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1930	Ridley Township
G-557	G-558	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1931	Ridley Township
G-558	G-559	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1932	Ridley Township

FORM G (13)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 29 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

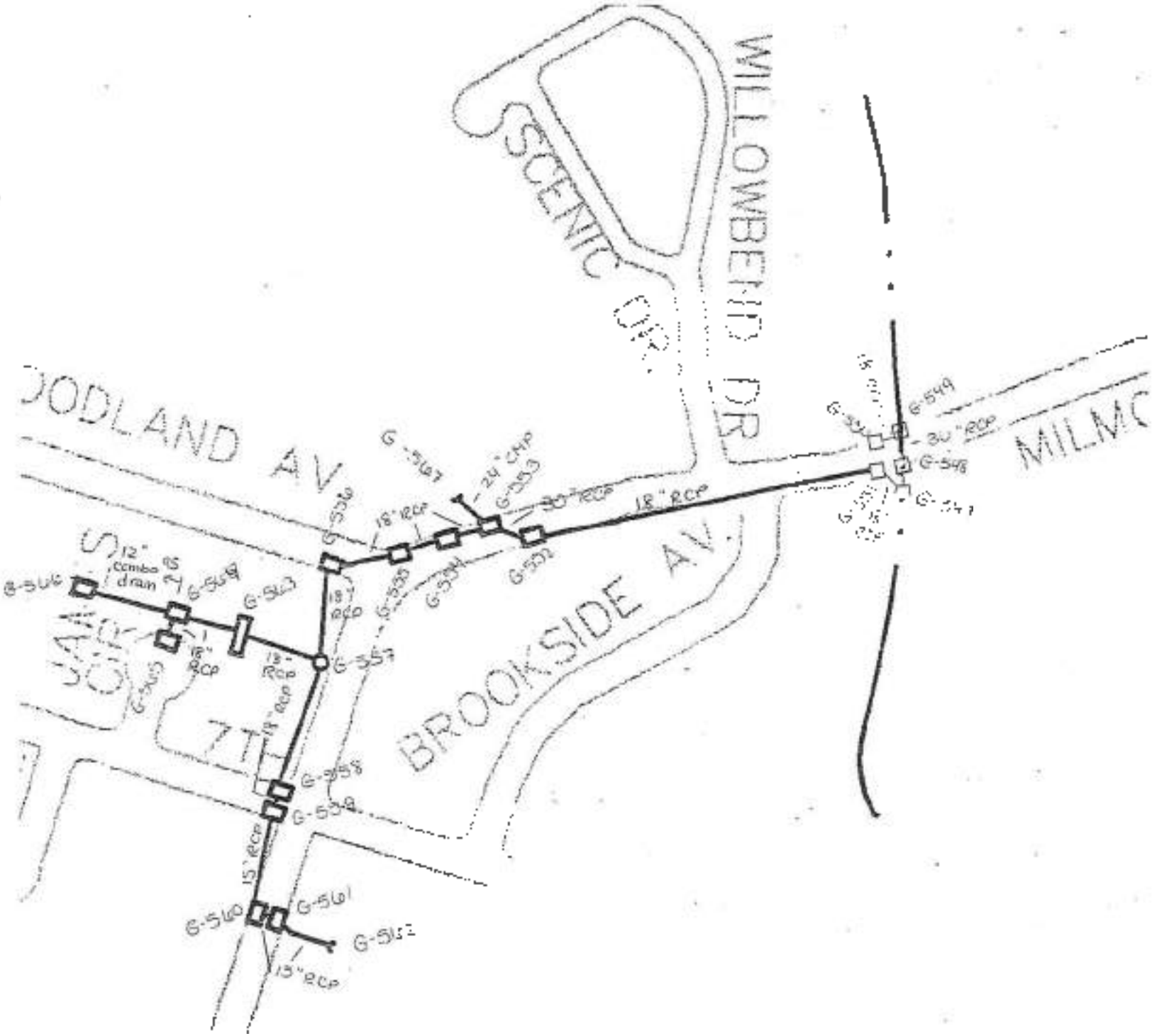
FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/11/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-559	G-560	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1933	Ridley Township
G-560	G-561	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1933	Ridley Township
G-561	G-562	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1922	Ridley Township
G-557	G-563	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1923	Ridley Township
G-563	G-564	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1924	Ridley Township
G-564	G-565	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1925	Ridley Township
G-554	G-566	X			12"				combo drain	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township


SCENIC DR.
WILLOWBEND DR
BROOKSIDE AV.
MILMC
G-547
24" CMP
G-553
30" RCP
18" RCP
G-549
30" RCP
G-548
G-554
G-552
G-555
G-556
12" combo
drain
G-557
G-558
G-559
G-560
G-561
G-562
15" RCP

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 30 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/12/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-597	G-598	X			18"				RCP	c. 1960	no	Anne Howanski 610-833-1933	Ridley Township
G-599	G-600	X			24"				RCP	c. 1966	no	Anne Howanski 610-833-1933	Ridley Township
G-600	G-601	X			18"				RCP	c. 1966	no	Anne Howanski 610-833-1922	Ridley Township
G-601	G-602	X			15"				RCP	c. 1966	no	Anne Howanski 610-833-1923	Ridley Township
G-602	G-603	X			24"				RCP	c. 1965	no	Anne Howanski 610-833-1924	Ridley Township
G-603	G-604	X			18"				RCP	c. 1980	no	Anne Howanski 610-833-1925	Ridley Township
G-604	G-605	X			15"				RCP	c. 1980	no	Anne Howanski 610-833-1926	Ridley Township
G-603	G-606	X			18"				RCP	c. 1966	no	Anne Howanski 610-833-1927	Ridley Township
G-606	G-607	X			18"				RCP	c. 1966	no	Anne Howanski 610-833-1928	Ridley Township
G-607	G-608	X			15"				RCP	c. 1966	no	Anne Howanski 610-833-1929	Ridley Township
G-606	G-609	X			18"				RCP	c. 1966	no	Anne Howanski 610-833-1930	Ridley Township
G-610	G-611	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township
G-611	G-512	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township

FORM G (14)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 31 OF 67

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-612	G-613	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-612	G-614	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-614	G-615	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1922	Ridley Township

BROOKSIDE
FULMER CIR.
HARDING AV.
ROOSEVELT AV.
MC KINLEY A
INGTON AV.
24" RCP
MARION LN.
NALL LA.
AV.
RD.
GIRARD
Crum Creek
G-609
G-608
G-607
G-606
G-605
G-604
G-603
G-602
G-601
G-600
G-599
G-598
G-597
G-614
G-615
G-612
G-613
G-611
G-610

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 32 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H Bricker
Telephone: 610-532-2884
Date: 8/12/2004

INSTRUCTIONS

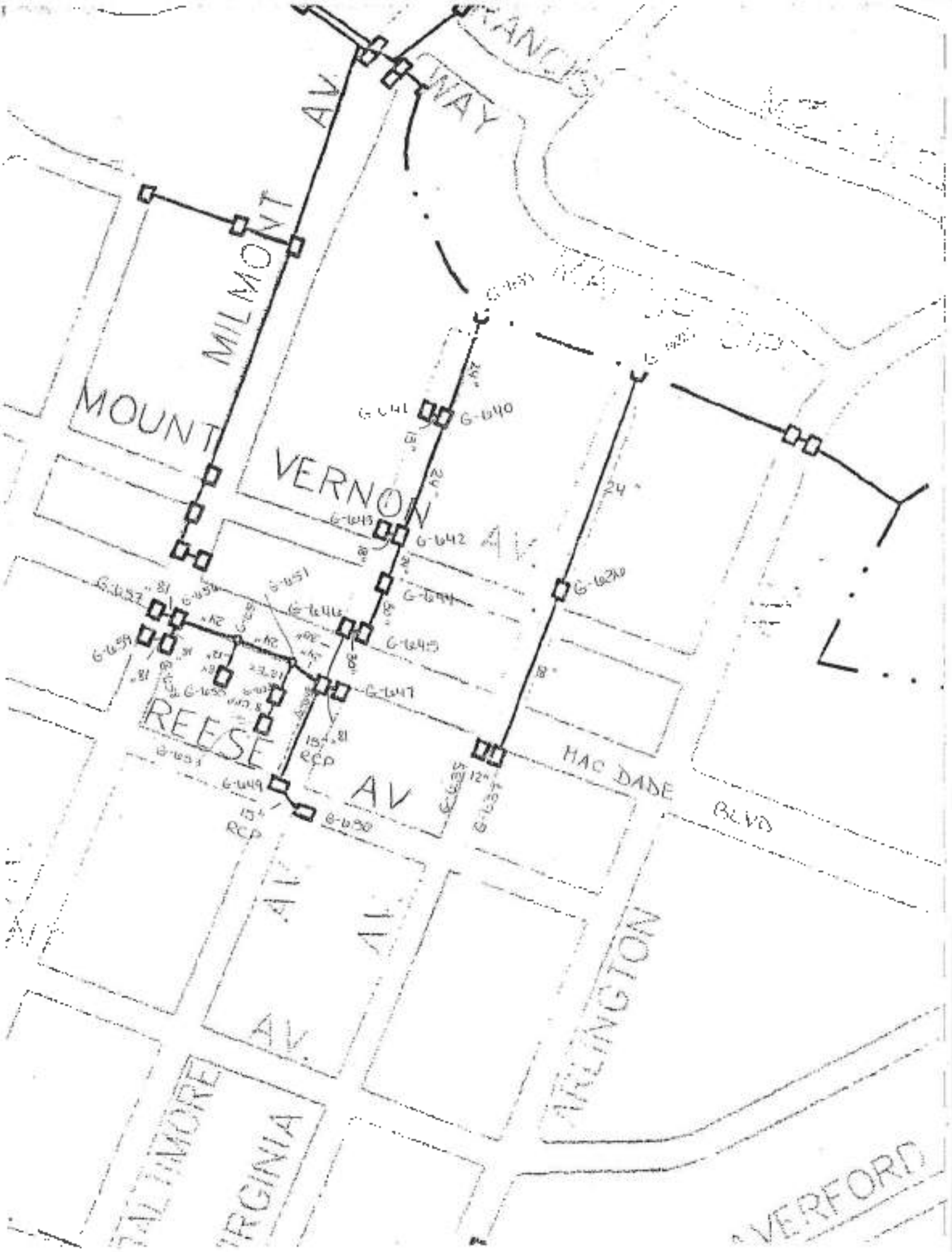
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-635	G-636	X			24"				RCP	c 1950	no	Anne Howanski 610-833-1933	Ridley Township
G-636	G-637	X			18"				RCP	c 1950	no	Anne Howanski 610-833-1933	Ridley Township
G-637	G-638	X			12"				RCP	c 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-639	G-640	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1923	Ridley Township
G-640	G-641	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1924	Ridley Township
G-640	G-642	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1925	Ridley Township
G-642	G-643	X			18"				RCP	c 1950	no	Anne Howanski 610-833-1926	Ridley Township
G-642	G-644	X			24"				RCP	c 1950	no	Anne Howanski 610-833-1927	Ridley Township
G-644	G-645	X			30"				RCP	c. 1950	no	Anne Howanski 610-833-1928	Ridley Township
G-645	G-646	X			30"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township
G-646	G-648	X			30"				RCP	c. 1950	no	Anne Howanski 610-833-1930	Ridley Township
G-648	G-647	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1931	Ridley Township
G-648	G-649	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1932	Ridley Township

FORM G (15)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 33 OF 67

Map ID No.		System's Elements (x)			Measurements'				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Fee/ Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-649	G-650	X			15"				RCP	c. 1950	no	Anne Howanski 610-833-1933	Ridley Township
G-648	G-651	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1933	Ridley Township
G-651	G-652	X			12"				RCP	c. 1950	no	Anne Howanski 610-833-1922	Ridley Township
G-652	G-653	X			8"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-651	G-654	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1924	Ridley Township
G-654	G-655	X			12"				RCP	c. 1950	no	Anne Howanski 610-833-1925	Ridley Township
G-654	G-656	X			24"				RCP	c. 1950	no	Anne Howanski 610-833-1926	Ridley Township
G-653	G-657	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1927	Ridley Township
G-656	G-658	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1928	Ridley Township
G-658	G-659	X			18"				RCP	c. 1950	no	Anne Howanski 610-833-1929	Ridley Township


MILMONT AV.
MOUNT VERNON AV.
REESE AV
MAC DADE BLVD
ARLINGTON
BALTIMORE
VIRGINIA
VERFORD
G-641
G-640
G-643
G-642
G-644
G-645
G-646
G-647
G-648
G-649
G-650
G-651
G-652
G-653
G-654
G-635
G-636
24"
18"
15"
RCP
18"
RCP

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 34 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/12/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-679	G-680	X			42"				RCP	c. 1993	no	Anne Howanski 610-833-1933	Ridley Township
G-680	G-681	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-680	G-683	X			42"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-679	G-682	X			42"				RCP	c. 1993	no	Anne Howanski 610-833-1923	Ridley Township
G-682	G-684	X			42"				RCP	c. 1993	no	Anne Howanski 610-833-1924	Ridley Township
G-684	G-685	X			24"				CPP	c. 1993	no	Anne Howanski 610-833-1925	Ridley Township
G-685	G-686	X			24"				CPP	c. 1993	no	Anne Howanski 610-833-1926	Ridley Township
G-686	G-687	X			24"				CPP	c. 1993	no	Anne Howanski 610-833-1927	Ridley Township
G-685	G-688	X			18"				CPP	c. 1993	no	Anne Howanski 610-833-1928	Ridley Township
G-688	G-689	X			18"				CPP	c. 1993	no	Anne Howanski 610-833-1929	Ridley Township
G-689	G-690	X			18"				CPP	c. 1993	no	Anne Howanski 610-833-1930	Ridley Township
G-690	G-691	X			12"				CPP	c. 1993	no	Anne Howanski 610-833-1931	Ridley Township
G-684	G-692	X			30"				CPP	c. 1993	no	Anne Howanski 610-833-1932	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 35 OF 87

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-692	G-693	X			42"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-693	G-694	X			42"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-694	G-695	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-695	G-696	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-696	G-697	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-697	G-698	X			10"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-698	G-699	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-699	G-700	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-700	G-701	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-699	G-702	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-702	G-703	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-698	G-704	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-704	G-705	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-705	G-706	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-706	G-707	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1934	Ridley Township
G-707	G-708	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1935	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 36 OF 67

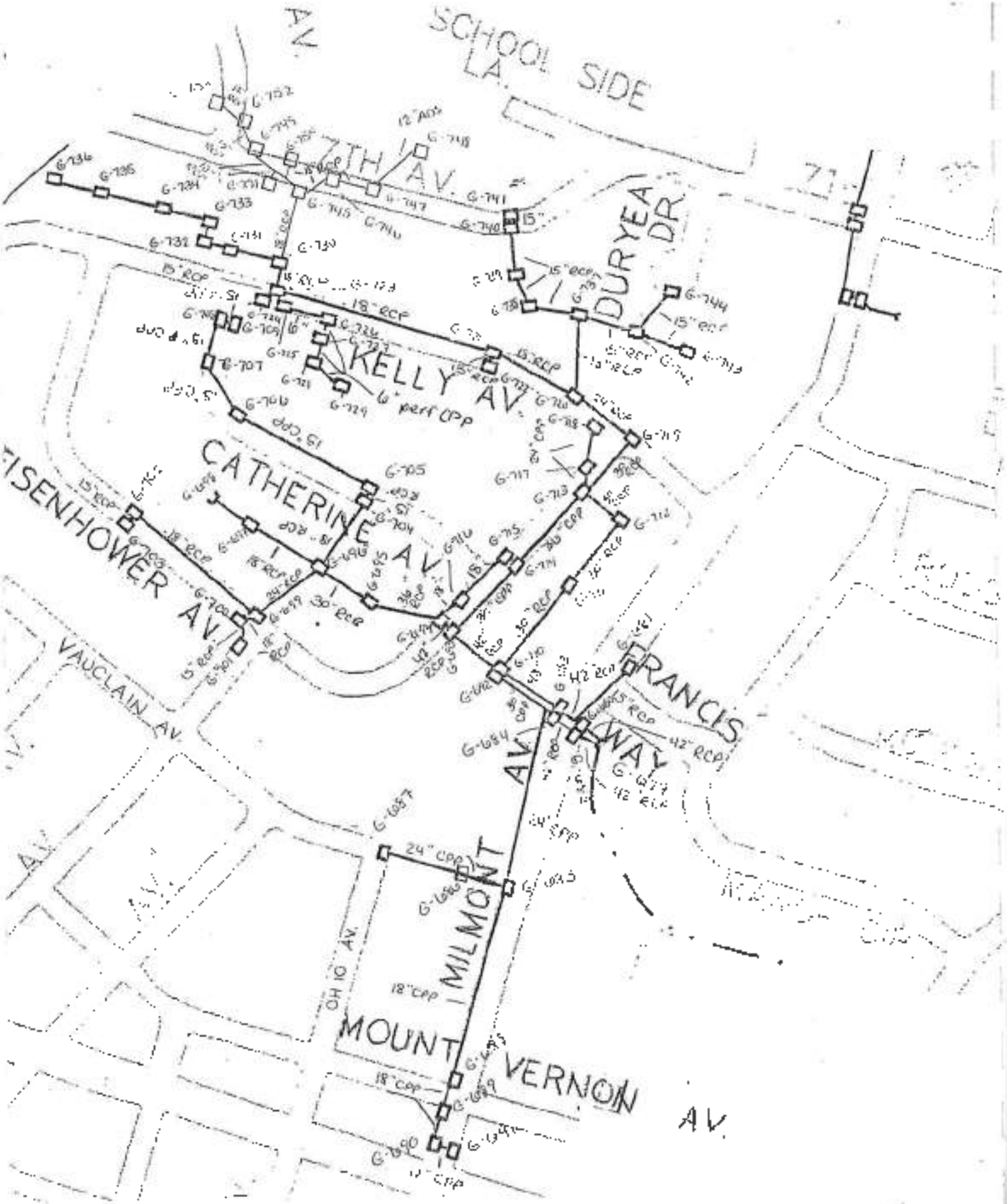
Map ID No.		System's Elements (x)			Measurements				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-708	G-709	X			15"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-883	G-710	X			48"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-710	G-711	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-711	G-712	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-712	G-713	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-713	G-714	X			36"				CPP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-714	G-693	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-715	G-716	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-716	G-694	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-713	G-717	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1930	Ridley Township
G-717	G-718	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1931	Ridley Township
G-713	G-719	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-719	G-720	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-720	G-721	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-721	G-722	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1935	Ridley Township
G-721	G-723	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 37 OF 67

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-723	G-724	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-725	G-726	X			6"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-726	G-727	X			6"				PCPP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-727	G-728	X			6"				PCPP	c. 1995	no	Anne Howanski 610-833-1925	Ridley Township
G-728	G-729	X			6"				PCPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-723	G-730	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-730	G-731	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-731	G-732	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-732	G-733	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-733	G-734	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-734	G-735	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-735	G-736	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-720	G-737	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-737	G-738	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1935	Ridley Township
G-738	G-739	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1936	Ridley Township
G-739	G-740	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 38 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-740	G-741	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-737	G-742	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-742	G-743	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-742	G-744	X			15"				RCP	c. 1960	no	Anne Howanski 610-833-1925	Ridley Township
G-730	G-745	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-745	G-746	X			"8"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-746	G-747	X			"8"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-747	G-748	X			12"				AUS	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-745	G-750	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-745	G-751	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-745	G-749	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-749	G-752	X			"5"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-752	G-753	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township


SCHOOL LA.
SIDE
7TH AV.
DURYEA DR
KELLY AV
CATHERINE AV
EISENHOWER AV
VAUCLAIN AV
FRANCIS WAY
MILMONT AV
MOUNT VERNON AV
OHIO AV
18" RCP
15" RCP
24" RCP
30" RCP
42" RCP
6" perf CPP
18" CPP
24" CPP

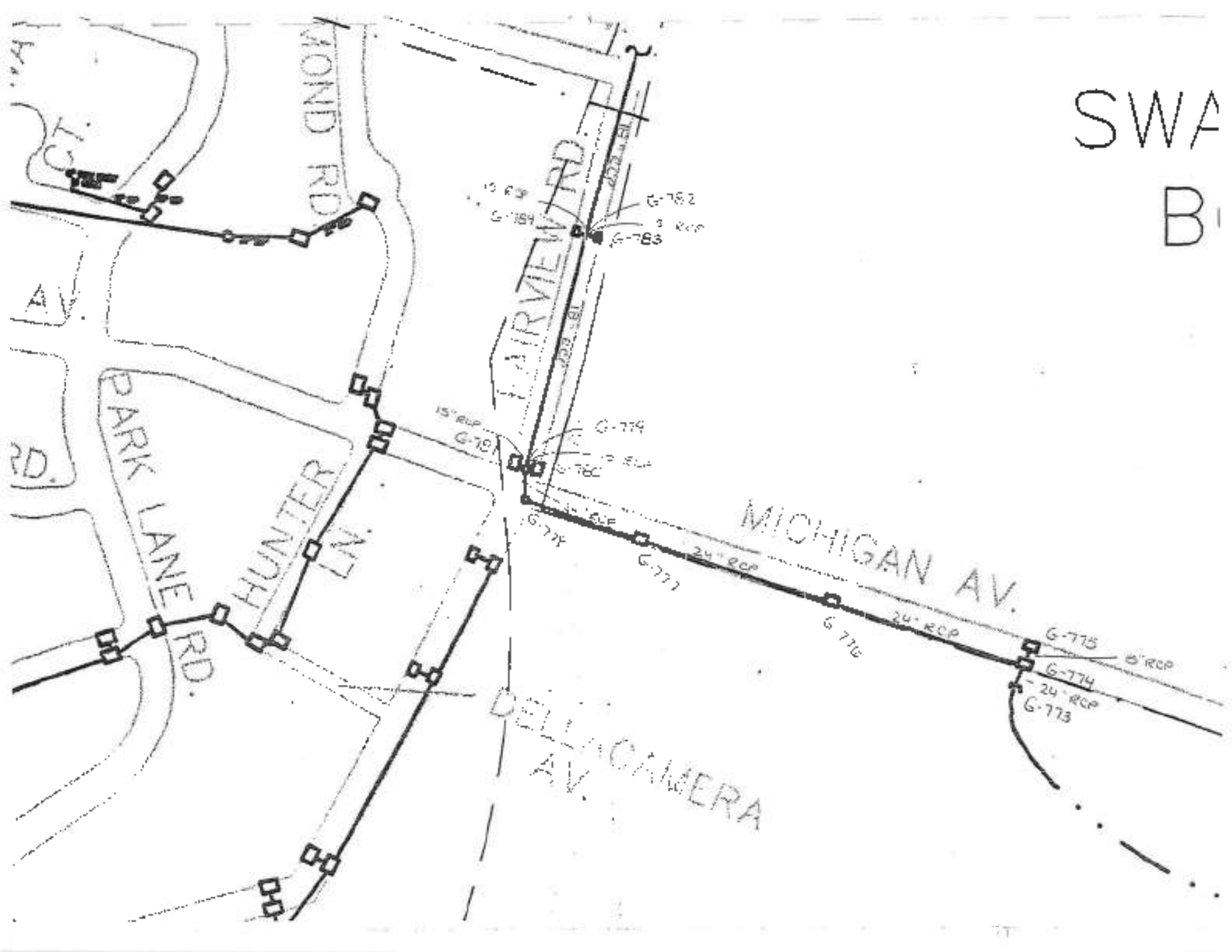
EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 39 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/18/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-773	G-774	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1933	Ridley Township
G-774	G-775	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1933	Ridley Township
G-774	G-776	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1922	Ridley Township
G-776	G-777	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1923	Ridley Township
G-777	G-778	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1924	Ridley Township
G-778	G-779	X			24"				RCP	c. 1957	no	Anne Howanski 610-833-1925	Ridley Township
G-779	G-780	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1926	Ridley Township
G-779	G-781	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1927	Ridley Township
G-779	G-782	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1928	Ridley Township
G-782	G-783	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1929	Ridley Township
G-782	G-784	X			15"				RCP	c. 1957	no	Anne Howanski 610-833-1930	Ridley Township
G-782	G-Swarth-more Boro	X			18"				RCP	c. 1957	no	Anne Howanski 610-833-1931	Ridley Township


SWA
B
MONDAMIN RD.
FAIRVIEW RD.
PARK LANE RD.
HUNTER LN.
MICHIGAN AV.
DELLACAMERA AV.
G-782
G-784
G-783
G-779
G-780
G-778
G-777
G-776
G-775
G-774
G-773
15" RCP
24" RCP
18" RCP
8" RCP

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 40 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/16/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-804	G-805	X			30"				RCP	c. 1953	no	Anne Howanski 610-833-1933	Ridley Township
G-805	G-806	X			30"				RCP	c. 1953	no	Anne Howanski 610-833-1933	Ridley Township
G-806	G-807	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1922	Ridley Township
G-806	G-808	X			30"				RCP	c. 1953	no	Anne Howanski 610-833-1923	Ridley Township
G-808	G-809	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1924	Ridley Township
G-809	G-810	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1925	Ridley Township
G-809	G-811	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1926	Ridley Township
G-811	G-812	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1927	Ridley Township
G-812	G-812A	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1928	Ridley Township
G-812A	G-813	X			27"				RCP	c. 1953	no	Anne Howanski 610-833-1929	Ridley Township
G-813	G-814	X			27"				RCP	c. 1953	no	Anne Howanski 610-833-1930	Ridley Township
G-814	G-815	X			24"				RCP	c. 1953	no	Anne Howanski 610-833-1931	Ridley Township
G-815	G-816	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1932	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 41 OF 67

Map ID No		System s Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Fea Ownership and Maintenance Respons bility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-815	G-817	X			24"				RCP	c 1953	no	Anne Howanski 610-833-1933	Rid ey Township
G-817	G-818	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1933	Ridley Township
G-818	G-819	X			18"				RCP	c. 1953	no	Anne Howanski 610-833-1922	Ridley Township
G-819	G-820	X			15"				RCP	c. 1953	no	Anne Howanski 610-833-1923	Ridley Township
G-817	G-821	X			21"				RCP	c. 1953	no	Anne Howanski 610-833-1924	Ridley Townsh p
G-821	G-822	X			8"				RCP	c. 1953	no	Anne Howanski 610-833-1925	Rid ey Township
G-821	G-823	X			8"				RCP	c. 1953	no	Anne Howanski 610-833-1926	Ridley Township
G-821	G-824	X			21"				RCP	c. 1953	no	Anne Howanski 610-833-1927	Ridley Township
G-824	G-825	X			21"				RCP	c. 1953	no	Anne Howanski 610-833-1928	Ridley Township
G-825	G-826	X			21"				RCP	c 1953	no	Anne Howanski 610-833-1929	Ridley Township

GRACE RD
BLACKROCK RD.
MICHIGAN AV.
CONWAY DR.
SCHIAVELLO DR.
CONWAY CT.
BLACKROCK RD.
CONWAY RD.
LANE
DRIVE

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 42 OF 67

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/16/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-846	G-848	X			42"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-847	G-848	X			30"				CPP	c. 1993	no	Anne Howanski 610-833-1933	Ridley Township
G-848	G-849	X			21"				RCP	c.1952	no	Anne Howanski 610-833-1922	Ridley Township
G-848	G-850	X			30"				CPP	c. 1993	no	Anne Howanski 610-833-1923	Ridley Township
G-849	G-850	X			42"				RCP	c. 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-850	G-852	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-850	G-851	X			36"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township
G-851	G-853	X			18"				CPP	c. 1993	no	Anne Howanski 610-833-1926	Ridley Township
G-851	G-854	X			36"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-854	G-855	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-855	G-856	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-854	G-857	X			36"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-857	G-858	X			8"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G.													SHEET 43 OF 87
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-857	G-859	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1932	Ridley Township
G-859	G-860	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-860	G-861	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1933	Ridley Township
G-861	G-862	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-861	G-863	X			30"				CPP	c. 1995	no	Anne Howanski 610-833-1923	Ridley Township
G-863	G-864	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1924	Ridley Township
G-864	G-865	X			24"				CPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-865	G-866	X			18"				CPP	c. 1995	no	Anne Howanski 610-833-1926	Ridley Township
G-866	G-867	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-867	G-868	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-868	G-869	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-869	G-870	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-870	G-871	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township
G-857	G-872	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-872	G-873	X							RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-873	G-874	X							RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 44 OF 67

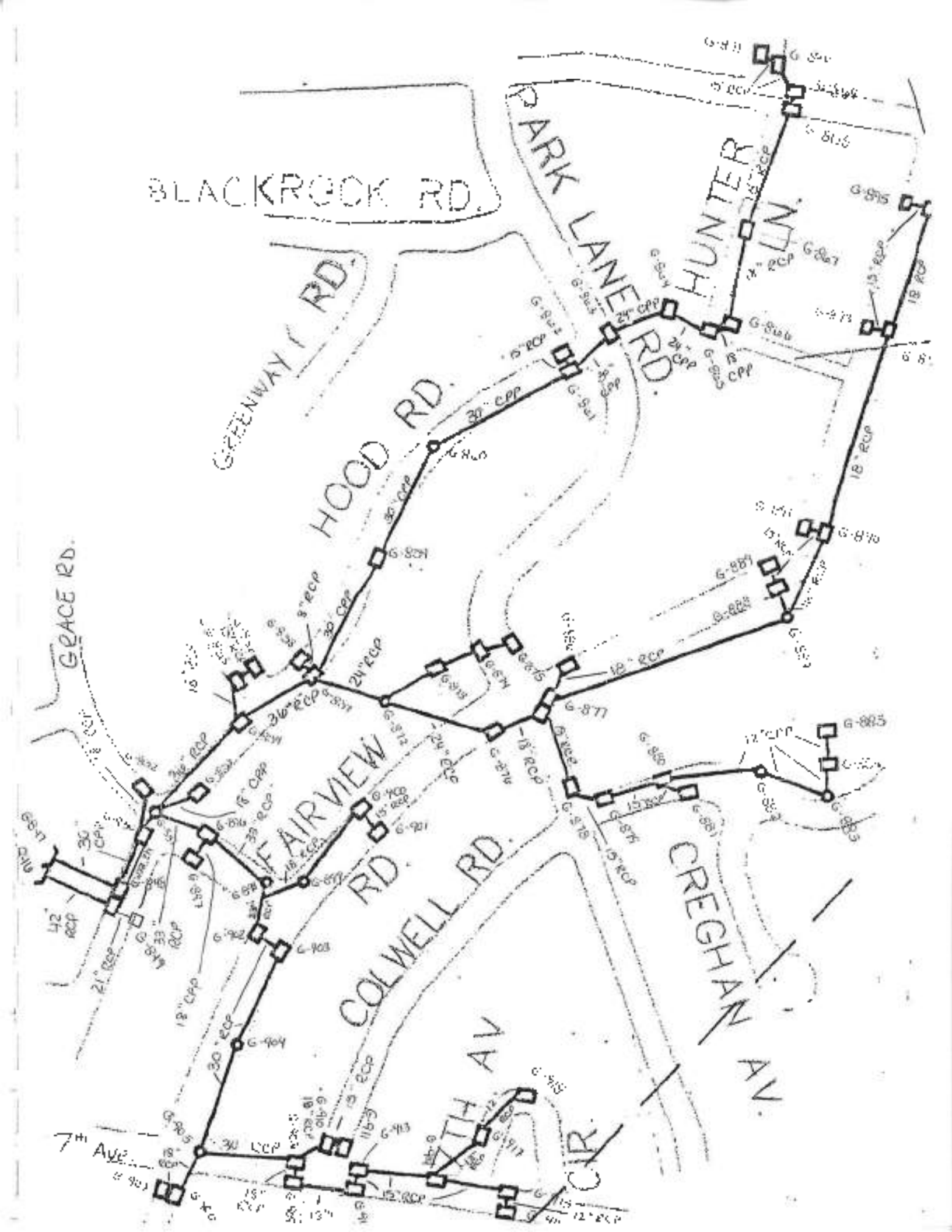
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-874	G-875	X							RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-872	G-876	X			24"				RCP	c. 1954	no	Anne Howanski 610-833-1933	Ridley Township
G-876	G-877	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1933	Ridley Township
G-877	G-878	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1922	Ridley Township
G-878	G-879	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1923	Ridley Township
G-879	G-880	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1924	Ridley Township
G-880	G-881	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1925	Ridley Township
G-880	G-882	X			12"				CPP	c. 1952	no	Anne Howanski 610-833-1926	Ridley Township
G-882	G-883	X			12"				CPP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-883	G-884	X			12"				CPP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-884	G-885	X			12"				CPP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-877	G-886	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1930	Ridley Township
G-877	G-887	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1931	Ridley Township
G-887	G-888	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1932	Ridley Township
G-888	G-889	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1930	Ridley Township
G-887	G-890	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 45 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Oper Channel	Swale	D	TW	B	Depth					
G-890	G-891	X			15"				RCP	c 1954	no	Anne Howansk 610-833-1932	Ridley Township
G-890	G-892	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1933	Ridley Township
G-892	G-893	X			15"				RCP	c 1954	no	Anne Howanski 610-833-1933	Ridley Township
G-892	G-894	X			18"				RCP	c. 1954	no	Anne Howanski 610-833-1922	Ridley Township
G-894	G-895	X			15"				RCP	c. 1954	no	Anne Howanski 610-833-1923	Ridley Township
G-851	G-896	X			33"				RCP	c 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-896	G-897	X			18"				CPP	c 1993	no	Anne Howanski 610-833-1925	Ridley Township
G-896	G-898	X			33"				RCP	c 1952	no	Anne Howanski 610-833-1926	Ridley Township
G-898	G-899	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-899	G-900	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-900	G-901	X			15"				RCP	c 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-898	G-502	X			33"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-902	G-903	X			30"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township
G-903	G-904	X			30"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-904	G-905	X			30"				RCP	c 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-905	G-906	X			18"				RCP	c 1952	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 46 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-906	G-907	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-905	G-908	X			30"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-908	G-910	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-910	G-911	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-908	G-909	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1922	Ridley Township
G-909	G-912	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1923	Ridley Township
G-912	G-913	X			15"				RCP	c. 1967	no	Anne Howanski 610-833-1924	Ridley Township
G-913	G-914	X			15"				RCP	c. 1967	no	Anne Howanski 610-833-1925	Ridley Township
G-914	G-915	X			15"				RCP	c. 1967	no	Anne Howanski 610-833-1926	Ridley Township
G-915	G-916	X			12"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-914	G-917	X			12"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-917	G-918	X			12"				RCP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township


BLACKROCK RD.
PARK LANE RD.
HUNTER LN.
GREENWAY CT.
HOOD RD.
GRACE RD.
FAIRVIEW RD.
COLWELL RD.
CREGHAN AV.
7TH AVE.

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 47 OF 67

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Jamie H. Bricker
Municipality:	Ridley Township	Telephone:	610-832-2684
County	Delaware	Date:	8/18/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements pipe size, or pipe direction. (Junknown outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Pipe Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From:	To	Pipe	Open Channel	Swale	D	T/W	S	Depth					
G-938	G-939	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1533	Ridley Township
G-940	G-941	X			18"				RCP	c. 1961	no	Anne Howanski 610-833-1533	Ridley Township
G-942	G-943	X			36"				ADS	c. 1991	no	Anne Howanski 610-833-1922	Ridley Township
G-943	G-944	X			30"				ADS	c. 1991	no	Anne Howanski 610-833-1923	Ridley Township
G-944	G-945	X			36"				ADS	c. 1991	no	Anne Howanski 610-833-1924	Ridley Township
G-945	G-946	X			36				ADS	c. 1991	no	Anne Howanski 610-833-1924	Ridley Township
G-946	G-947	X			36"				ADS	c. 1991	no	Anne Howanski 610-833-1925	Ridley Township
G-947	G-948	X			36"				ADS	c. 1991	no	Anne Howanski 610-833-1925	Ridley Township
G-948	G-949	X			12"				ADS	c. 1991	no	Anne Howanski 610-833-1927	Ridley Township
G-949	G-950	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1928	Ridley Township
G-950	G-951	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1929	Ridley Township
G-945	G-952	X			30"				RCP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-952	G-953	X			30"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM (3)

SHEET 48 OF 87

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Fee Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-953	G-954	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-954	G-955	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1933	Ridley Township
G-955	G-956	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1933	Ridley Township
G-956	G-957	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1933	Ridley Township
G-958	G-958	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1923	Ridley Township
G-959	G-960	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1924	Ridley Township
G-960	G-961	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1925	Ridley Township
G-960	G-962	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1926	Ridley Township
G-962	G-961	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1927	Ridley Township
G-962	G-963	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1928	Ridley Township
G-963	G-964	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1929	Ridley Township
G-966	G-965	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-968	G-969	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township
G-968	G-967	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-967	G-966	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-966	G-969	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 49 OF 67

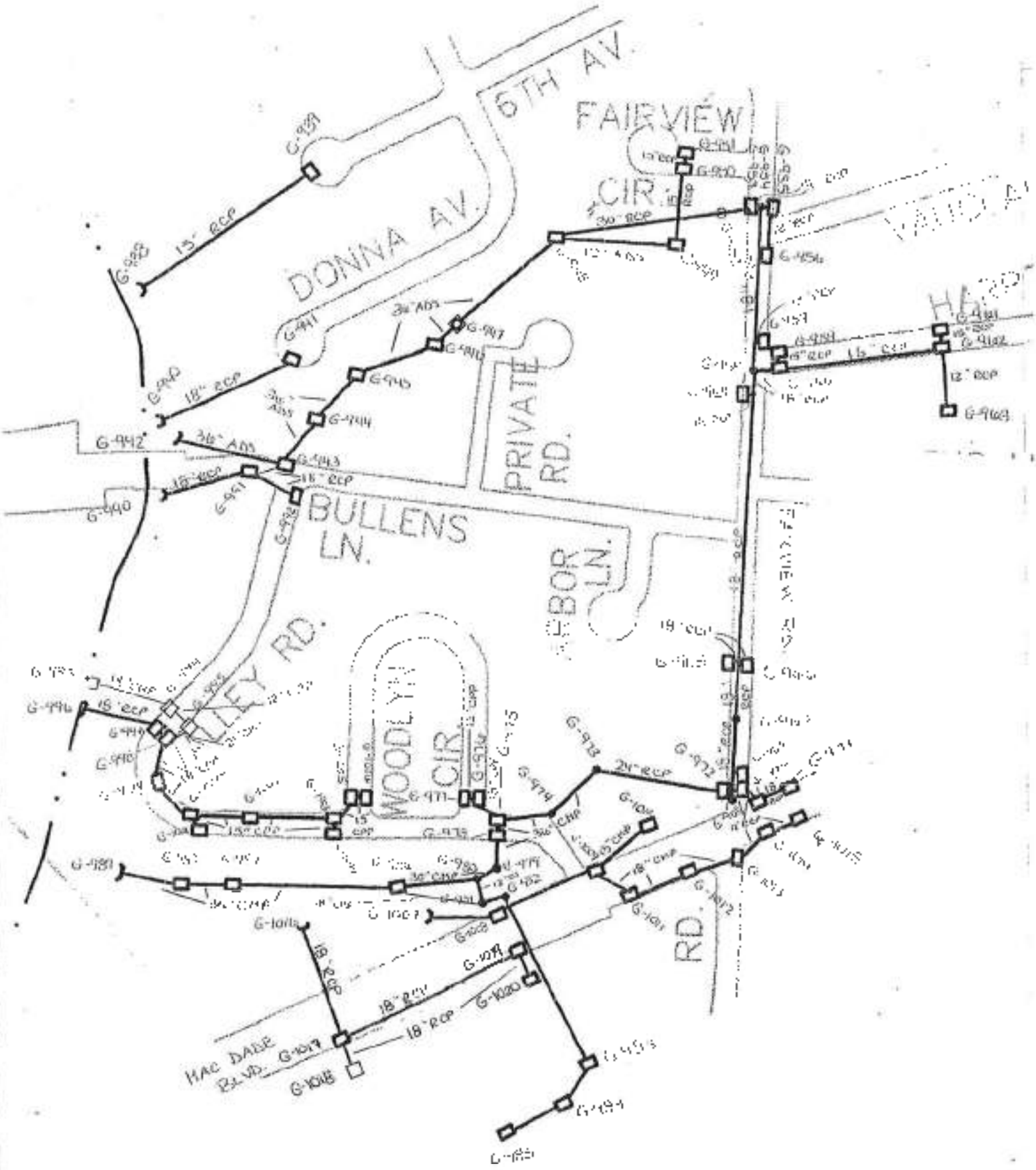
Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-969	G-970	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-970	G-971	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1933	Ridley Township
G-968	G-972	X			24"				RCP	c. 1959	no	Anne Howanski 610-833-1933	Ridley Township
G-972	G-973	X			24"				RCP	c. 1959	no	Anne Howanski 610-833-1922	Ridley Township
G-973	G-974	X			36"				CMP	c. 1991	no	Anne Howanski 610-833-1923	Ridley Township
G-974	G-975	X			36"				CMP	c. 1991	no	Anne Howanski 610-833-1924	Ridley Township
G-975	G-976	X			15"				CPP	c. 1998	no	Anne Howanski 610-833-1925	Ridley Township
G-976	G-977	X			12"				CPP	c. 1998	no	Anne Howanski 610-833-1926	Ridley Township
G-975	G-978	X			36"				CMP	c. 1991	no	Anne Howanski 610-833-1927	Ridley Township
G-978	G-979	X			36"				CMP	c. 1991	no	Anne Howanski 610-833-1928	Ridley Township
G-979	G-980	X			30"				CMP	c. 1991	no	Anne Howanski 610-833-1929	Ridley Township
G-980	G-951	X			12"				CIP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-981	G-982	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township
G-982	G-983	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-983	G-984	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-984	G-985	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 20 OF 67

Map ID No		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-983	G-980	X			30"				CMP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-985	G-981	X			18"				CMP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-986	G-987	X			36"				CMP	c. 1987	no	Anne Howanski 610-833-1933	Ridley Township
G-987	G-988	X			36"				CMP	c. 1961	no	Anne Howanski 610-833-1933	Ridley Township
G-988	G-989	X			36"				CMP	c. 1961	no	Anne Howanski 610-833-1932	Ridley Township
G-990	G-991	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1923	Ridley Township
G-991	G-943	X			15"				RCP	c. 1959	no	Anne Howanski 610-832-1926	Ridley Township
G-991	G-992	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1926	Ridley Township
G-993	G-994	X			18"				CMP	c. 1996	no	Anne Howanski 610-833-1926	Ridley Township
G-994	G-995	X			12"				CPP	c. 1996	no	Anne Howanski 610-833-1927	Ridley Township
G-995	G-997	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1926	Ridley Township
G-997	G-998	X			15"				RCP	c. 1959	no	Anne Howanski 610-833-1929	Ridley Township
G-998	G-999	X			21"				CPP	c. 1986	no	Anne Howanski 610-833-1930	Ridley Township
G-999	G-999	X			12"				CPP	c. 1996	no	Anne Howanski 610-833-1931	Ridley Township
G-999	G-1000	X			18"				CPP	c. 1996	no	Anne Howanski 610-833-1932	Ridley Township
G-1000	G-1001	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1930	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 51 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1000	G-1002	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1931	Ridley Township
G-1002	G-1003	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1932	Ridley Township
G-1003	G-1004	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1932	Ridley Township
G-1003	G-1005	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1933	Ridley Township
G-1005	G-1006	X			15"				CPP	c. 1996	no	Anne Howanski 610-833-1933	Ridley Township
G-1007	G-1008	X			24"				RCP	c. 1959	no	Anne Howanski 610-833-1922	Ridley Township
G-1008	G-1009	X			24"				RCP	c. 1959	no	Anne Howanski 610-833-1923	Ridley Township
G-1009	G-1010	X			15"				CMP	c. 1959	no	Anne Howanski 610-833-1924	Ridley Township
G-1009	G-1011	X			15"				CMP	c. 1959	no	Anne Howanski 610-833-1925	Ridley Township
G-1011	G-1012	X			18"				CMP	c. 1959	no	Anne Howanski 610-833-1926	Ridley Township
G-1012	G-1013	X			18"				CMP	c. 1959	no	Anne Howanski 610-833-1927	Ridley Township
G-1013	G-1014	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1928	Ridley Township
G-1014	G-1015	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1929	Ridley Township
G-1016	G-1017	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1930	Ridley Township
G-1017	G-1018	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1931	Ridley Township
G-1017	G-1019	X			18"				RCP	c. 1959	no	Anne Howanski 610-833-1932	Ridley Township
G-1019	G-1020	X			18"				RCP	c. 1959	no	Anne Howanski	Ridley Township


6TH AV.
FAIRVIEW CIR.
DONNA AV.
PRIVATE RD.
BULLENS LN.
BOR LN.
WOODLAWN CIR.
RD.
HAC DADE BLVD.
15" RCP
18" RCP
24" RCP
36" ADS
36" CMP
G-990
G-991
G-992
G-993
G-994
G-995
G-996
G-997
G-998
G-999
G-1000
G-1001
G-1002
G-1003
G-1004
G-1005
G-1006
G-1007
G-1008
G-1009
G-1010
G-1011
G-1012
G-1013
G-1014
G-1015
G-1016
G-1017
G-1018
G-1019
G-1020
G-1021
G-1022
G-1023
G-1024
G-1025
G-1026
G-1027
G-1028
G-1029

FORM G (2")

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 52 OF 87

WATERSHED

Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: James H. Brooke
Telephone: 610-532-2884
Date: 8/17/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the parts within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-2 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1040	G-1041	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-1041	G-1042	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-1042	G-1043	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1922	Ridley Township
G-1043	G-1044	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1923	Ridley Township
G-1044	G-1045	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-1044	G-1046	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-1046	G-1047	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township
G-1046	G-1048	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township
G-1048	G-1049	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-1050	G-1051	X			30"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-1051	G-1052	X			30"				RCP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-1052	G-1053	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-1053	G-1054	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 53 OF 87

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1055	G-1056	X			27"				RCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-1056	G-1057	X			12"				PVC	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-1057	G-1058	X			15"				ADS	c. 1990	no	Anne Howanski 610-833-1933	Ridley Township
G-1058	G-1059	X			15"				ADS	c. 1990	no	Anne Howanski 610-833-1922	Ridley Township
G-1059	G-1060	X			12"				ADS	c. 1990	no	Anne Howanski 610-833-1923	Ridley Township
G-1060	G-1061	X			12"				ADS	c. 1990	no	Anne Howanski 610-833-1924	Ridley Township
G-1061	G-1062	X			12"				ADS	c. 1990	no	Anne Howanski 610-833-1925	Ridley Township
G-1062	G-1063	X			12"				ADS	c. 1990	no	Anne Howanski 610-833-1926	Ridley Township
G-1056	G-1064	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1927	Ridley Township
G-1064	G-1066	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1928	Ridley Township
G-1065	G-1066	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1929	Ridley Township
G-1066	G-1067	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-1066	G-1068	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township
G-1066	G-1069	X			12"				VCP	c. 1952	no	Anne Howanski 610-833-1932	Ridley Township
G-1069	G-1070	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1930	Ridley Township
G-1070	G-1071	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1931	Ridley Township

FORM G (2 of)

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 54 OF 57

Map ID No.		System's Elements (x)			Measurements				Material	Year Constr.	Design Calc. Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	T/B	#	Depth					
G-1071	G-1072	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1937	Ridley Township
G-1071	G-1073	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1937	Ridley Township
G-1073	G-1074	X			15"				RCP	c. 1952	no	Anne Howanski 610-833-1937	Ridley Township
G-1074	G-1075	X			12"				RCP	c. 1952	no	Anne Howanski 610-833-1922	Ridley Township
G-1076	G-1077	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township
G-1077	G-1078	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1924	Ridley Township
G-1079	G-1080	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township
G-1080	G-1081	X			12"				RCP	c. 1952	no	Anne Howanski 610-833-1925	Ridley Township

Ckum Creek
BALIGNAC AV.
YOUNGS AV.
MAY
GRANT AVE
Jefferson AV.

FORM G (22

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 55 OF 57

WATERSHED		FORM COMPLETED BY	
Name	Crum Creek	Name	Jamie H. Bricker
Municipality:	Ridley Township	Telephone	610-532-2584
County:	Delaware	Date	8/17/2004

INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1101	G-1102	X			30"				RCP	c. 1941	no	Anne Howanski 610-833-1933	Ridley Township
G-1102	G-1103	X			30"				RCP	c. 1941	no	Anne Howanski 610-833-1933	Ridley Township
G-1103	G-1104	X			30"				RCP	c. 1941	no	Anne Howanski 610-833-1922	Ridley Township
G-1104	G-1105	X			18"				RCP	c. 1941	no	Anne Howanski 610-833-1923	Ridley Township
G-1105	G-1106	X			18"				RCP	c. 1941	no	Anne Howanski 610-833-1924	Ridley Township
G-1104	G-1107	X			30"				RCP	c. 1941	no	Anne Howanski 610-833-1924	Ridley Township
G-1107	G-1108	X			30"				RCP	c. 1941	no	Anne Howanski 610-833-1925	Ridley Township
G-1108	G-1109	X			18"				RCP	c. 1941	no	Anne Howanski 610-833-1926	Ridley Township
G-1104	G-1110	X			30"				CMP	c. 1941	no	Anne Howanski 610-833-1927	Ridley Township
G-1110	G-1112	X			18"				RCP	c. 1941	no	Anne Howanski 610-833-1928	Ridley Township
G-1112	G-1111	X			15"				RCP	c. 1941	no	Anne Howanski 610-833-1929	Ridley Township
G-1110	G-1113	X			30"				CMP	c. 1941	no	Anne Howanski 610-833-1930	Ridley Township
G-1113	G-1114	X			30"				CMP	c. 1941	no	Anne Howanski 610-833-1931	Ridley Township

FORM G (22)

EXISTING STORMWATER COLLECTION SYSTEM FORM C

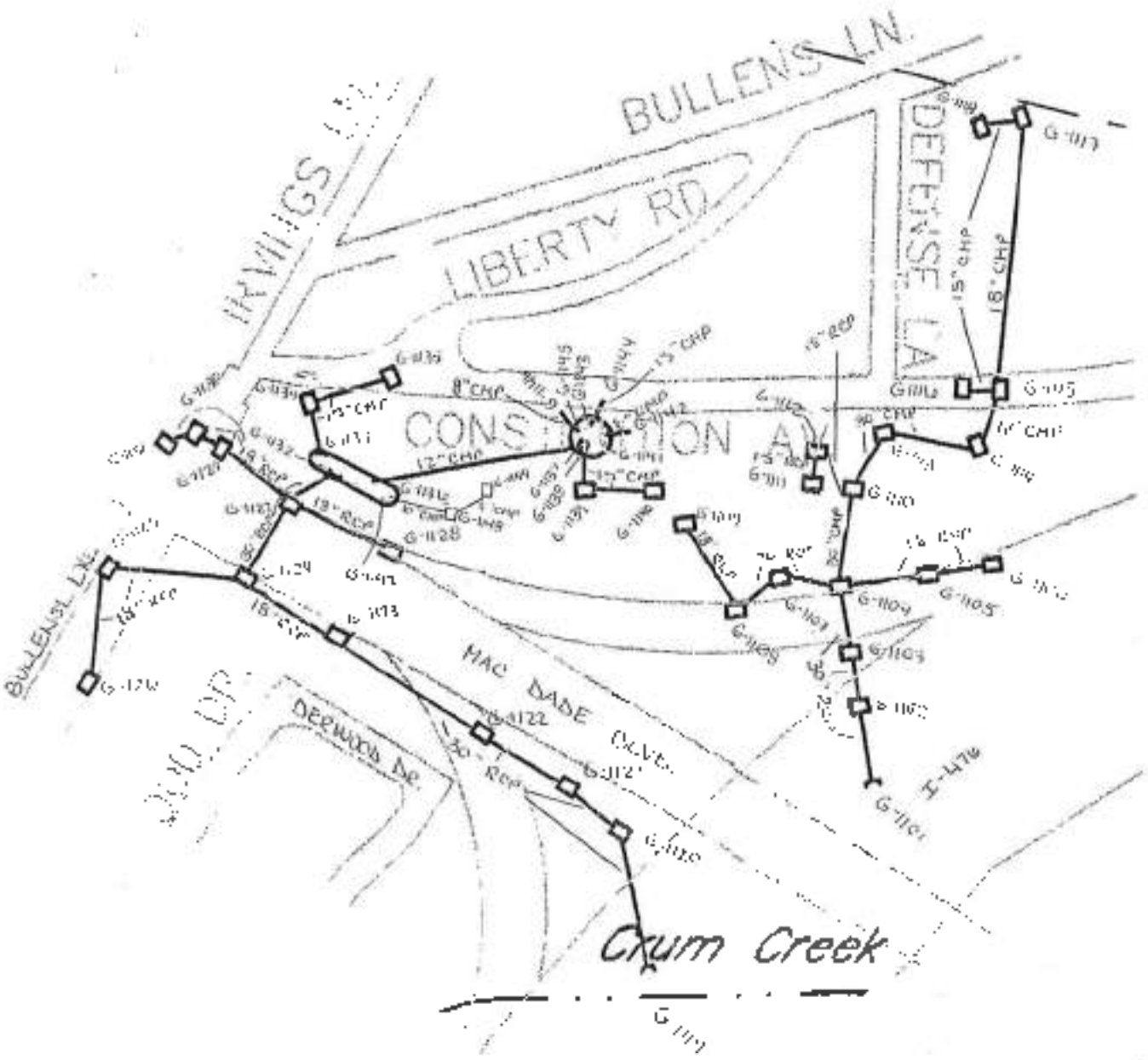
Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Pipe Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1114	G-1115	X			6"				CMP	c. 1941	no	Anne Howanski 610-833-1932	Ridley Township
G-1115	G-1116	X			15				CMP	c. 1941	no	Anne Howanski 610-833-1933	Ridley Township
G-1116	G-1117	X			15"				CMP	c. 1941	no	Anne Howanski 610-833-1953	Ridley Township
G-1117	G-1118	X			15"				CMP	c. 1941	no	Anne Howanski 610-833-1922	Ridley Township
G-1119	G-1120	X			30"				RCP	c. 1983	no	Anne Howanski 610-833-1923	Ridley Township
G-1120	G-1121	X			30"				RCP	c. 1983	no	Anne Howanski 610-833-1924	Ridley Township
G-1121	G-1122	X			30"				RCP	c. 1983	no	Anne Howanski 610-833-1925	Ridley Township
G-1122	G-1123	X			30"				RCP	c. 1983	no	Anne Howanski 610-833-1926	Ridley Township
G-1123	G-1124	X			15"				RCP	c. 1983	no	Anne Howanski 610-833-1927	Ridley Township
G-1124	G-1125	X			15"				RCP	c. 1983	no	Anne Howanski 610-833-1928	Ridley Township
G-1125	G-1126	X			18"				RCP	c. 1983	no	Anne Howanski 610-833-1929	Ridley Township
G-1126	G-1127	X			30"				RCP	c. 1983	no	Anne Howanski 610-833-1930	Ridley Township
G-1127	G-1128	X			15				RCP	c. 1983	no	Anne Howanski 610-833-1931	Ridley Township
G-1127	G-1129	X			18"				RCP	c. 1983	no	Anne Howanski 610-833-1932	Ridley Township
G-1129	G-1130	X			18"				RCP	c. 1983	no	Anne Howanski 610-833-1930	Ridley Township
G-1130	G-1131	X			18"				RCP	c. 1983	no	Anne Howanski 610-833-1931	Ridley Township

FORM G (23)

EXISTING STORMWATER COLLECTION SYSTEM FORM G

SHEET 5* OF 57

Map ID No.		System's Elements (X)			Measurements*				Material	Year Const.	Design Data Available	Contact Person Name and Phone	Name of Fee Ownership and Maintenance Responsible
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	T/W	B	Depth					
G-1127	G-1132	X			30"				RCP	c. 1982	no	Anne Howanski 610-833-1945	Ridley Township
G-1133	G-1134	X			15"				CMP	c. 1982	no	Anne Howanski 610-833-1933	Ridley Township
G-1134	G-1135	X			15"				CMP	c. 1983	no	Anne Howarski 610-833-1933	Ridley Township
G-1136	G-1137	X			12"				CMP	c. 1983	no	Anne Howanski 610-833-1922	Ridley Township
G-1147	G-1108	X			12"				CMP	c. 1993	no	Anne Howanski 610-833-1923	Ridley Township
G-1145	G-1146	X			5"				CMP	c. 1983	no	Anne Howanski 610-833-1924	Ridley Township
G-1138	G-1139	X			15"				CMP	c. 1982	no	Anne Howanski 610-833-1923	Ridley Township
G-1139	G-1140	X			15"				CMP	c. 1983	no	Anne Howanski 610-833-1924	Ridley Township
G-1141	G-1142	X			6"				CMP	c. 1983	no	Anne Howanski 610-833-1925	Ridley Township
G-1143	G-1144	X			15"				CMP	c. 1983	no	Anne Howanski 610-833-1926	Ridley Township
G-1145	G-1146	X			6"				CMP	c. 1983	no	Anne Howanski 610-833-1925	Ridley Township


BULLENS LN.
LIBERTY RD.
DEFENSE LA
HAWKINS
CONSTITUTION AVE
BULLENS LN.
MAC DADE BLVD.
DEERWOOD DR.
Crum Creek

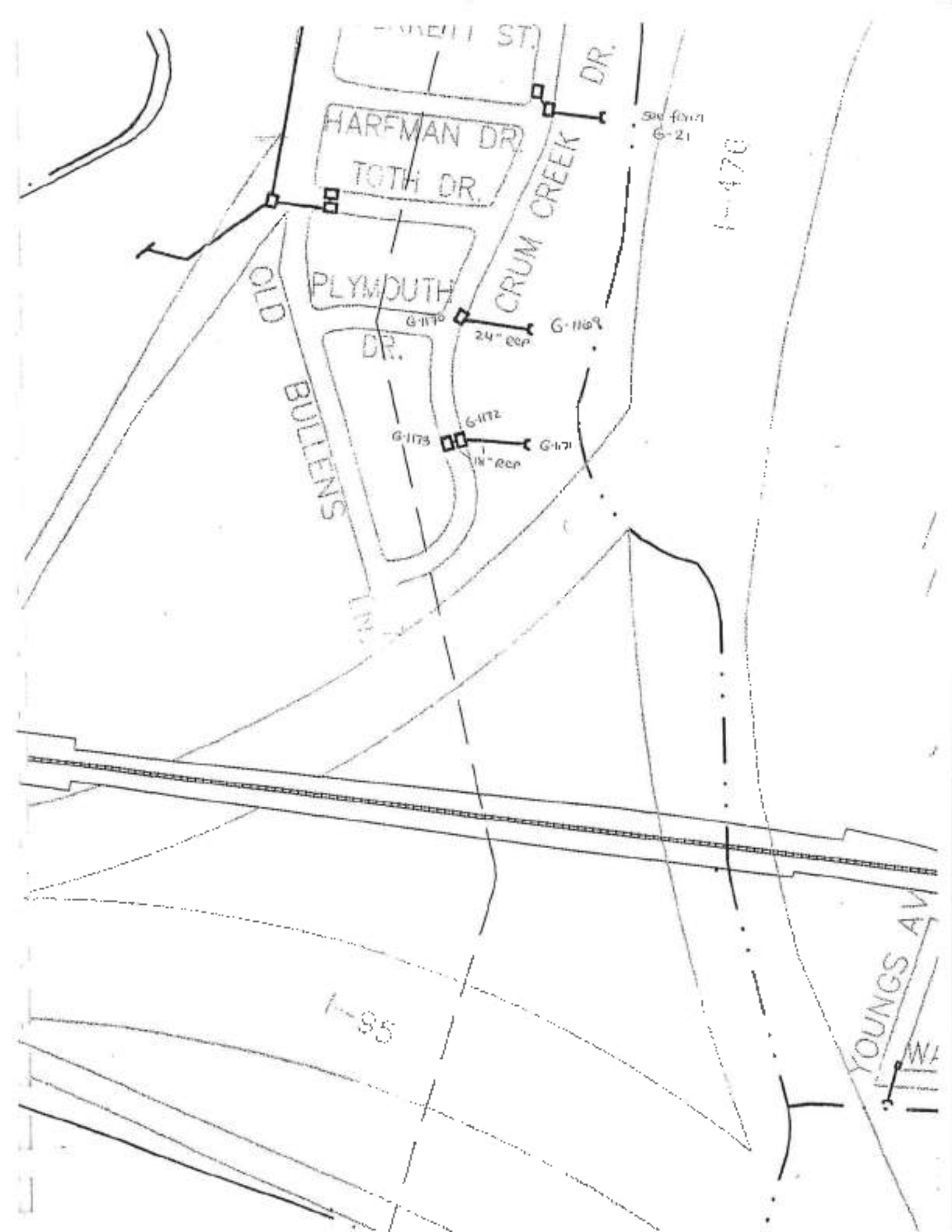
EXISTING EXISTING FLOOD CONTROL PROJECT FORM G SHEET 58 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 8/17/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map ID No.		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1169	G-1170	X			24"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-1171	G-1172	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1933	Ridley Township
G-1172	G-1173	X			18"				RCP	c. 1952	no	Anne Howanski 610-833-1922	Ridley Township


HARFMAN DR.
TOTH DR.
PLYMOUTH DR.
CRUM CREEK DR.
OLD BULLENS
I-476
I-95
YOUNGS AV
G-1170
G-1169
24" RCP
G-1172
G-1173
G-1171
18" RCP
G-21

EXISTING STORMWATER COLLECTION SYSTEM FORM G SHEET 58 OF 67

WATERSHED		FORM COMPLETED BY		INSTRUCTIONS
Name	Crum Creek	Name:	James H. Brooke	Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. If unknown, outline the system extent. Complete the form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.
Municipality	Ridley Township	Telephone	610-532-2884	
County	Delaware	Date	8/17/2004	

Map ID No		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Entity Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1193	G-1194	X			72"				CMP	c. 1960	no	Anne Howarski 610-833-1933	Ridley Township
G-1194	G-1195	X			15"				CMP	c. 1955	no	Anne Howarski 610-833-1933	Ridley Township
G-1194	G-1195	X			72"				CMP	c. 1960	no	Anne Howarski 610-833-1922	Ridley Township
G-1196	G-1197	X			24"				CPP	c. 2004	no	Anne Howarski 610-933-1923	Ridley Township
G-1197	G-1198	X			24"				CPP	c. 2004	no	Anne Howarski 610-933-1924	Ridley Township
G-1198	G-1199	X			18"				CPP	c. 2004	no	Anne Howarski 610-933-1925	Ridley Township
G-1199	G-1200	X			18"				CPP	c. 2004	no	Anne Howarski 610 933 1926	Ridley Township
G-1196	G-1201	X			72"				CMP	c. 1960	no	Anne Howarski 610-833-1927	Ridley Township
G-1201	G-1202	X			72"				CMP	c. 1955	no	Anne Howarski 610-833-1928	Ridley Township
G-1202	G-1203	X			72"				CMP	c. 1955	no	Anne Howarski 610-833-1928	Ridley Township
G-1203	G-1204	X			24"				CPP	c. 2004	no	Anne Howarski 610-833-1930	Ridley Township
G-1204	G-1205	X			18				CPP	c. 2004	no	Anne Howarski 610-833-1931	Ridley Township
G-1205	G-1206	X			15"				RCP	c. 1955	no	Anne Howarski 610-833-1932	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G SHEET 60 OF 2?

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1206	G-1207	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1933	Ridley Township
G-1207	G-1208	X			15"				CPP	c. 2004	no	Anne Howanski 610-833-1930	Ridley Township
G-1209	G-1209	X			72"				CMP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-1209	G-1210	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-1210	G-1211	X			21"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-1209	G-1212	X			72"				CMP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-1212	G-1213	X			54"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-1213	G-1214	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1927	Ridley Township
G-1214	G-1215	X			15"				CPP	c. 2004	no	Anne Howanski 610-833-1928	Ridley Township
G-1215	G-1216	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1929	Ridley Township
G-1216	G-1217	X			15"				CPP	c. 2004	no	Anne Howanski 610-833-1930	Ridley Township
G-1217	G-1218	X			54"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-1218	G-1219	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1932	Ridley Township
G-1216	G-1220	X			15"				CPP	c. 2004	no	Anne Howanski 610-833-1933	Ridley Township
G-1216	G-1221	X			30"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-1221	G-1222	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1935	Ridley Township

FORM G (24)

EXISTING STORMWATER COLLECTION SYSTEM FORM G.														SHEET 91 OF 97
Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Pipe Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	T/W	B	Depth					
G-1221	G-1223	X			18"				CPP	c. 2004	no	Anne Howanski 610-833-1939	Ridley Township
G-1221	G-1224	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1224	G-1225	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-1225	G-1226	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-1226	G-1227	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-1227	G-1228	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-1227	G-1229	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-1225	G-1230	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-1225	G-1231	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-1231	G-1232	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1929	Ridley Township
G-1231	G-1233	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-1233	G-1234	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-1234	G-1235	X			21"				CMP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-1233	G-1235	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1226	G-1237	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-1237	G-1236	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1935	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G SHEET 52 OF ET

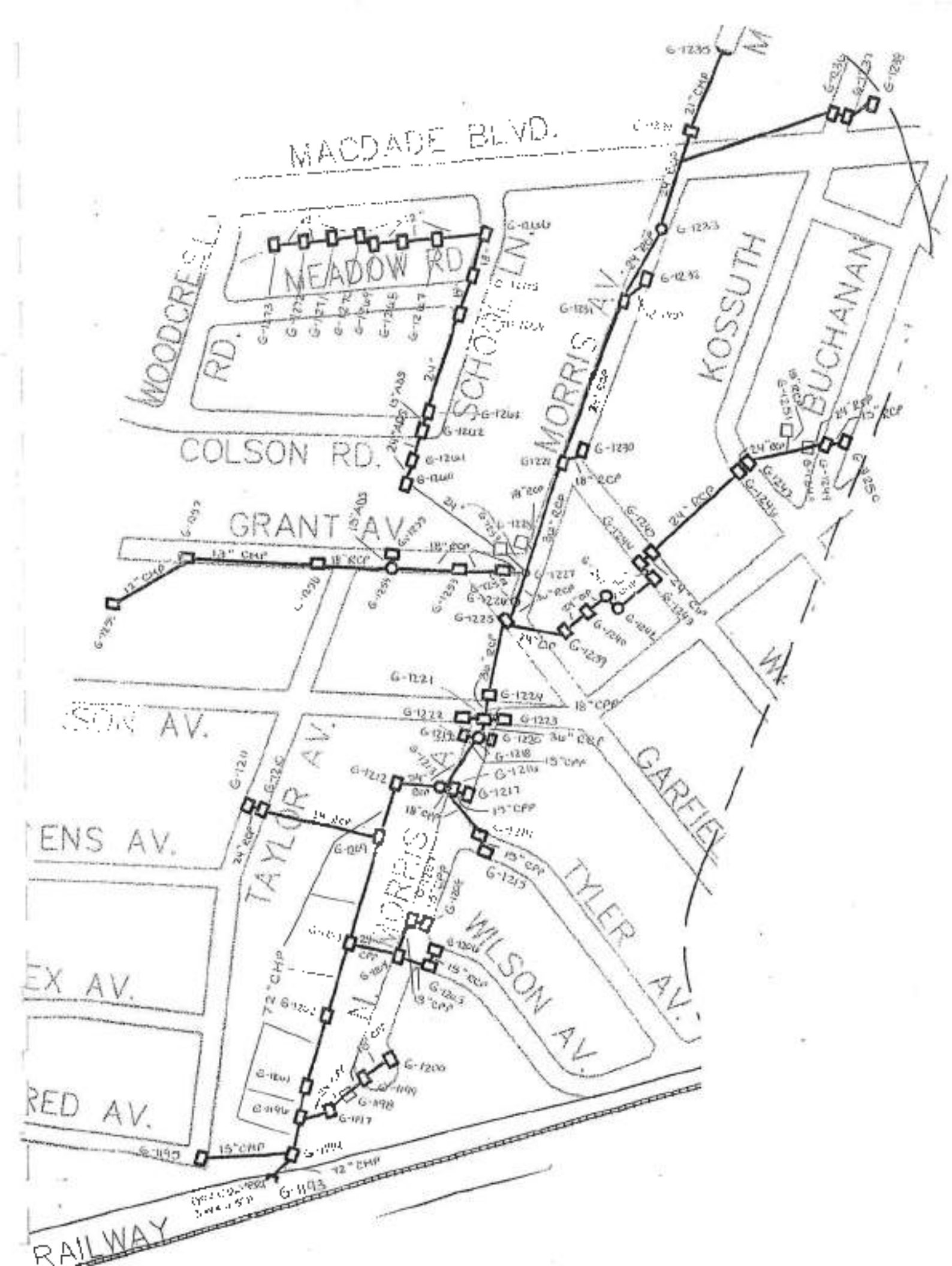
Map ID No		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Feat (Ownership and Maintenance Responsibility)
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1225	G-1239	X			24"				CIP	c. 1955	no	Anne Howanek 610-833-1933	Ridley Township
G-1239	G-1240	X			24"				CIP	c. 1955	no	Anne Howanek 610-833-1933	Ridley Township
G-1240	G-1241	X			24"				CIP	c. 1955	no	Anne Howanek 610-833-1922	Ridley Township
G-1241	G-1242	X			36"				CMP	c. 1969	no	Anne Howanek 610-833-1923	Ridley Township
G-1242	G-1243	X			36"				CMP	c. 1969	no	Anne Howanek 610-833-1924	Ridley Township
G-1243	G-1244	X			29"				CMP	c. 1969	no	Anne Howanek 610-833-1925	Ridley Township
G-1244	G-1245	X			24"				CIP	c. 1955	no	Anne Howanek 610-833-1926	Ridley Township
G-1245	G-1246	X			24"				RCP	c. 1955	no	Anne Howanek 610-833-1927	Ridley Township
G-1246	G-1247	X			24"				RCP	c. 1955	no	Anne Howanek 610-833-1928	Ridley Township
G-1247	G-1248	X			24"				RCP	c. 1955	no	Anne Howanek 610-833-1929	Ridley Township
G-1248	G-1249	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1249	G-1250	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-1247	G-1251	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-1227	G-1252	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-1252	G-1253	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1935	Ridley Township
G-1253	G-1254	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G. SHEET 63 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1254	G-1255	X			15"				ADS	c. 1991	no	Anne Howanski 610-833-1933	Ridley Township
G-1254	G-1256	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-1256	G-1257	X			18"				CMP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-1257	G-1258	X			12"				CMP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-1227	G-1259	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-1259	G-1260	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1926	Ridley Township
G-1260	G-1261	X			24"				ADS	c. 1991	no	Anne Howanski 610-833-1927	Ridley Township
G-1261	G-1262	X			24"				ADS	c. 1991	no	Anne Howanski 610-833-1928	Ridley Township
G-1262	G-1263	X			15"				ADS	c. 1991	no	Anne Howanski 610-833-1929	Ridley Township
G-1263	G-1264	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-1264	G-1265	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-1265	G-1266	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-1266	G-1267	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1267	G-1268	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1934	Ridley Township
G-1268	G-1269	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1935	Ridley Township
G-1269	G-1270	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1936	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G SHEET 64 OF 67

Map ID No.		System's Elements (X)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1270	G-1271	X			12"				RCP	c. 1965	no	Anne Howanski 610-833-1933	Ridley Township
G-1271	G-1272	X			12"				RCP	c. 1965	no	Anne Howanski 610-833-1922	Ridley Township
G-1272	G-1273	X			12"				RCP	c. 1965	no	Anne Howanski 610-833-1523	Ridley Township


MACDADE BLVD.
MEADOW RD.
WOODCREST RD.
COLSON RD.
GRANT AV.
MORRIS AV.
KOSSUTH
BUCHANAN
TAYLOR AV.
WILSON AV.
TYLER AV.
GARFIELD
ENS AV.
EX AV.
RED AV.
RAILWAY

EXISTING STORM WATER COLLECTION SYSTEM FORM G. SHEET 25 OF 67

WATERSHED
Name: Crum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY
Name: Jamie H. Stryker
Telephone: 610-532-2884
Date: 8/17/2004

INSTRUCTIONS
Diagram each system on the appropriate map. Establish map point to show changes in system elements (pipe size or pipe direction) (if unknown outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1, G-2, G-3). Start the first point in each additional system 20 numbers higher. For example: G-5 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse

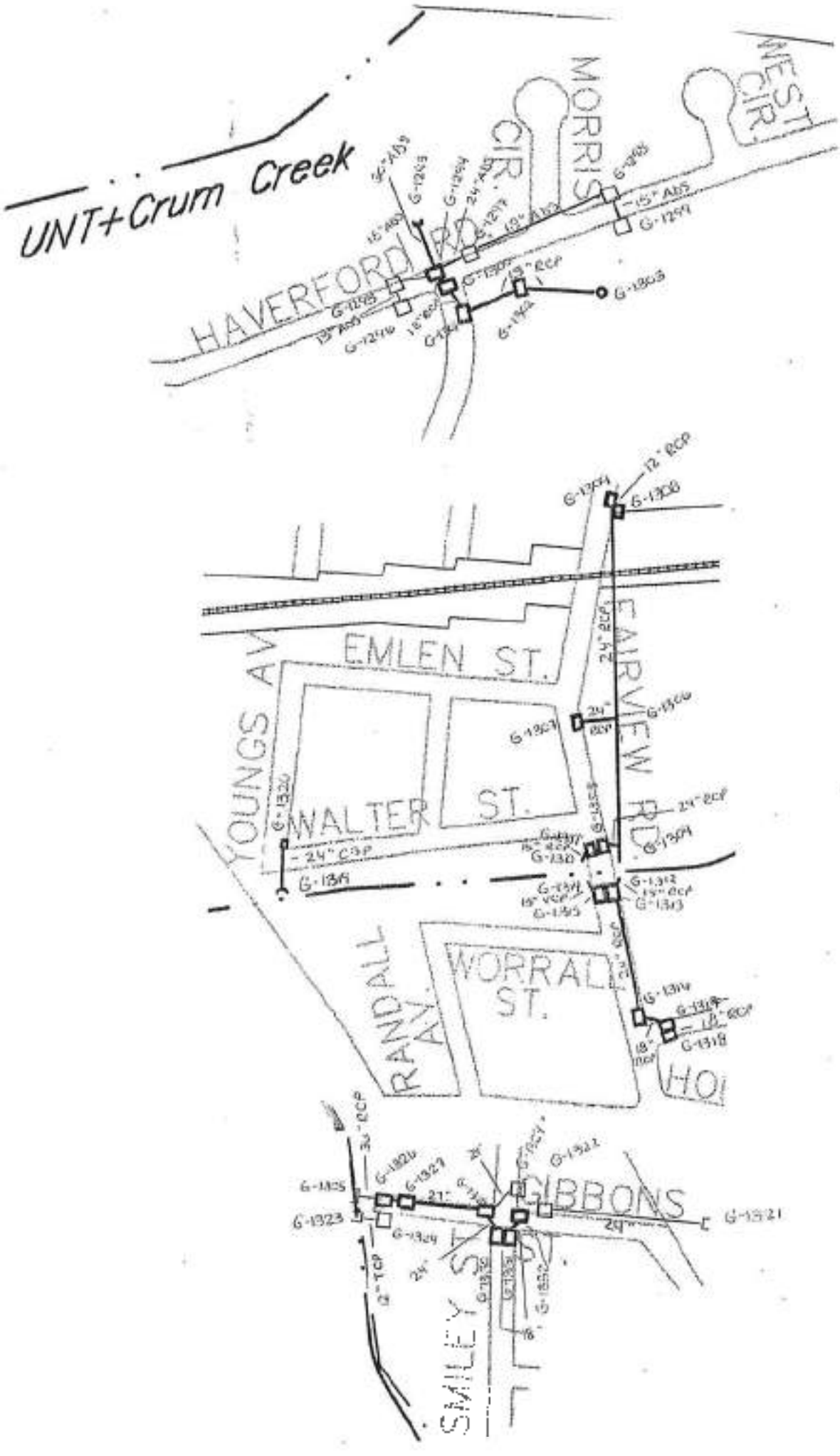
Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Pipe Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	Ø	T/W	B	Depth					
G-1293	G-1294	X			30"				ADS	c. 1990	no	Anne Howanski 610-833-1933	Ridley Township
G-1294	G-1295	X			18"				ADS	c. 1990	no	Anne Howanski 610-833-1933	Ridley Township
G-1295	G-1296	X			15"				ADS	c. 1990	no	Anne Howanski 610-833-1927	Ridley Township
G-1294	G-1297	X			24"				ADS	c. 1990	no	Anne Howanski 610-833-1923	Ridley Township
G-1297	G-1298	X			18"				ADS	c. 1990	no	Anne Howanski 610-833-1924	Ridley Township
G-1298	G-1299	X			15"				ADS	c. 1990	no	Anne Howanski 610-833-1925	Ridley Township
G-1294	G-1300	X			18"				RCP	c. 1955	no	Anne Howanski 610 833-1925	Ridley Township
G-1300	G-1301	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-1301	G-1302	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1928	Ridley Township
G-1302	G-1303	X			18"				RCP	c. 1955	no	Anne Howanski 610 833-1929	Ridley Township
G-1304	G-1305	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1930	Ridley Township
G-1304	G-1306	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1931	Ridley Township
G-1306	G-1307	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM G — SHEET 68 OF 67

Map ID No		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Owner who Maintains Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-1309	G-1308	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1308	G-1309	X			12"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1310	G-1311	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1922	Ridley Township
G-1312	G-1313	X			15"				RCP	c. 1955	no	Anne Howanski 610-833-1923	Ridley Township
G-1314	G-1315	X			15"				VCP	c. 1955	no	Anne Howanski 610-833-1924	Ridley Township
G-1315	G-1316	X			24"				RCP	c. 1955	no	Anne Howanski 610-833-1925	Ridley Township
G-1316	G-1317	X			18"				RCP	c. 1955	no	Anne Howanski 610 833-1926	Ridley Township
G-1317	G-1318	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1927	Ridley Township
G-1319	G-1320	X			24"				CSP	c. 1973	no	Anne Howanski 610-833-1928	Ridley Township
G-1321	G-1322	X			24"				RCP	c. 1955	no	Anne Howanski 610 833-1929	Ridley Township
G-1323	G-1324	X			12"				TCP	c. 1955	no	Anne Howanski 610 833-1930	Ridley Township
G-1325	G-1325	X			36"				RCP	c. 1955	no	Anne Howanski 610 833 1931	Ridley Township
G-1326	G-1327	X			36"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-1327	G-1328	X			27"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township
G-1328	G-1329	X			24"				RCP	c. 1955	no	Anne Howanek 610-833-1933	Ridley Township
G-1328	G-1330	X			24"				RCP	c. 1955	no	Anne Howanek 610-833-1934	Ridley Township

EXISTING STORMWATER COLLECTION SYSTEM FORM C. SHEET 57 OF 67

Map ID No.		System's Elements (x)			Measurements*				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	T-W	B	Depth					
G-1930	G-1931	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1932	Ridley Township
G-1931	G-1932	X			18"				RCP	c. 1955	no	Anne Howanski 610-833-1933	Ridley Township


UNT to Crum Creek
HAVERFORD RD.
MORRIS CIR.
WEST CIR.
EMLEN ST.
WALTER ST.
WORRALL ST.
FAIRVIEW RD.
YOUNGS AV
RANDALL AV
GIBBONS
SMILEY ST

FORM H

PROPOSED FLOOD CONTROL PROJECT FORM H SHEET 1 OF 1

FORM COMPLETED BY

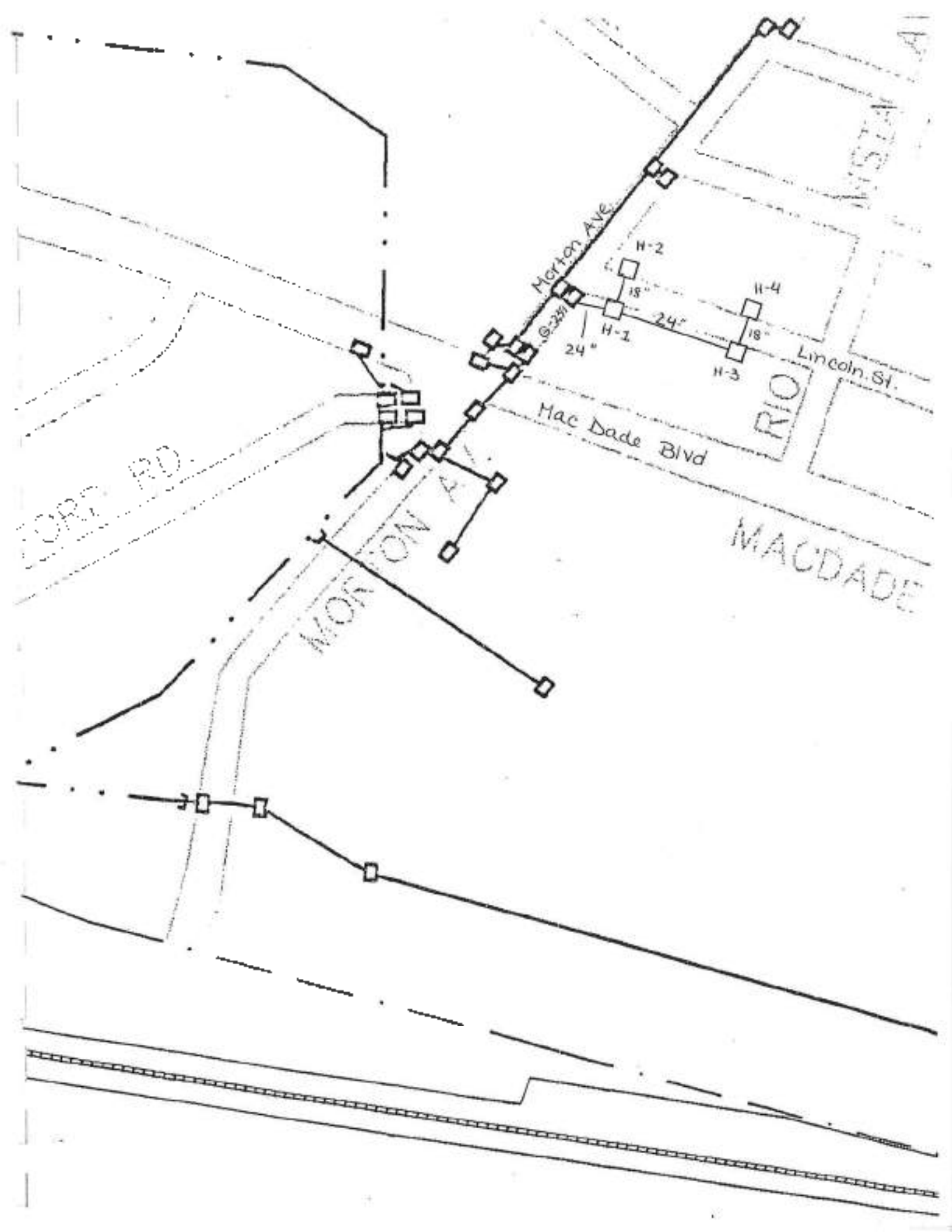
Name Jamie H. Bricker
Telephone 610-532-2884
Date 8/17/2004

INSTRUCTIONS

[illegible] Indicate a map point to show changes in system elements, pipe size, pipe direction and connection to existing system. For proposed underground drainage systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed [illegible] Identify the points within a system consecutively (ex. D-1, D-2, D-3). Start the first point in each [illegible] Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system form and map. See Sample Diagram and chart on reverse.

System's Elements (x)		Measurements*				Material	Map I.D Nos.**	Proposed Constr. Dates		Design Data	Contact Person	Name of Final Ownership and
		Pipe	Channel / Swale									
Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Available	Name and Phone	Maintenance Responsibility
		24"				HDPE	2	Sep-04	Dec-04	yes	Anne Howanski 610-833-1922	Ridley Township
		18"				HDPE	2	Sep-04	Dec-04	yes	Anne Howanski 610-833-1923	Ridley Township
		24"				HDPE	2	Sep-04	Dec-04	yes	Anne Howanski 610-833-1924	Ridley Township
		18"				HDPE	2	Sep-04	Dec-04	yes	Anne Howanski 610-833-1925	Ridley Township

side. **Enter the stormwater problem areas' Map I.D. Nos., if proposed project will solve or reduce any / all of the drainage problems.


Morton Ave.
H-2
18"
H-4
24"
H-1
24"
18"
H-3
Lincoln St.
Mac Dade Blvd
RIO
MACDADE

FORM I

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM I. SHEET 1 OF 3

WATERSHED

Name: Chum Creek
Municipality: Ridley Township
County: Delaware

FORM COMPLETED BY

Name: Jamie H. Bricker
Telephone: 610-532-2884
Date: 3/23/2004

DEFINITION

FLOOD HAZARD AREA
A normally dry land area that has been or is susceptible to being inundated by the 100-year flood.

For County Use:

Map ID No	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
I - 1	Residential - 1300 block Adams St	?	Various Owners	
I - 2	Residential and Industrial 600 block Smiley St	?	Various Owners	
I - 3	Residential 1300 Block Miller St	?	Various Owners	
I - 4	Residential, Commercial, and Industrial 1400 block Gibbons St	?	Various Owners	
I - 5	Industrial and Commercial south 1400 block Chester Pk north 1400 and 1500 blk Chester Pk	?	Various Owners	
I - 6	Residential north 1300 block Worrall St	?	Various Owners	
I - 7	Residential 100 block Randall St	?	Various Owners	
I - 8	Industrial and Residential Weber St	?	Various Owners	

FOR...

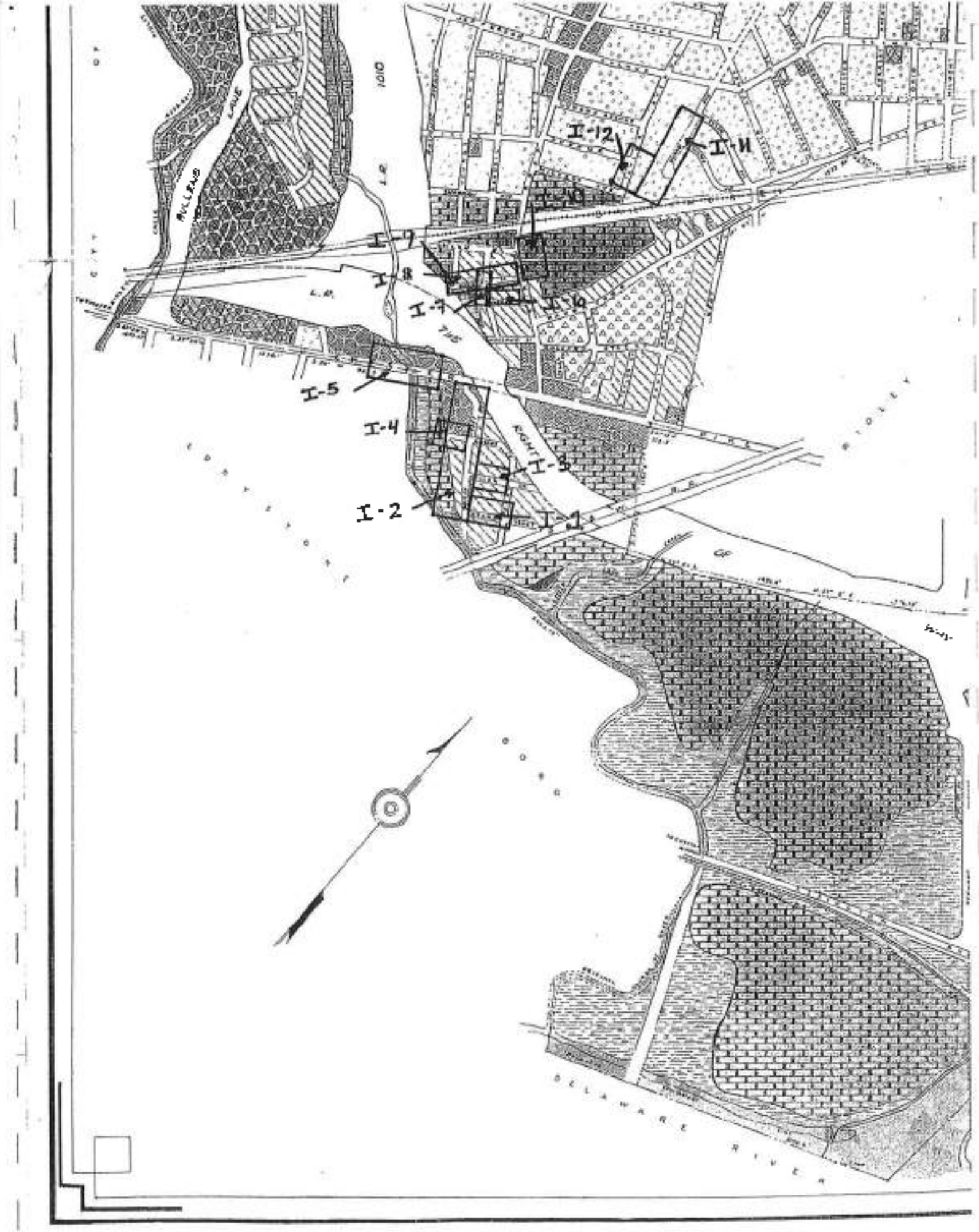
PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM I SHEET 2 OF 3

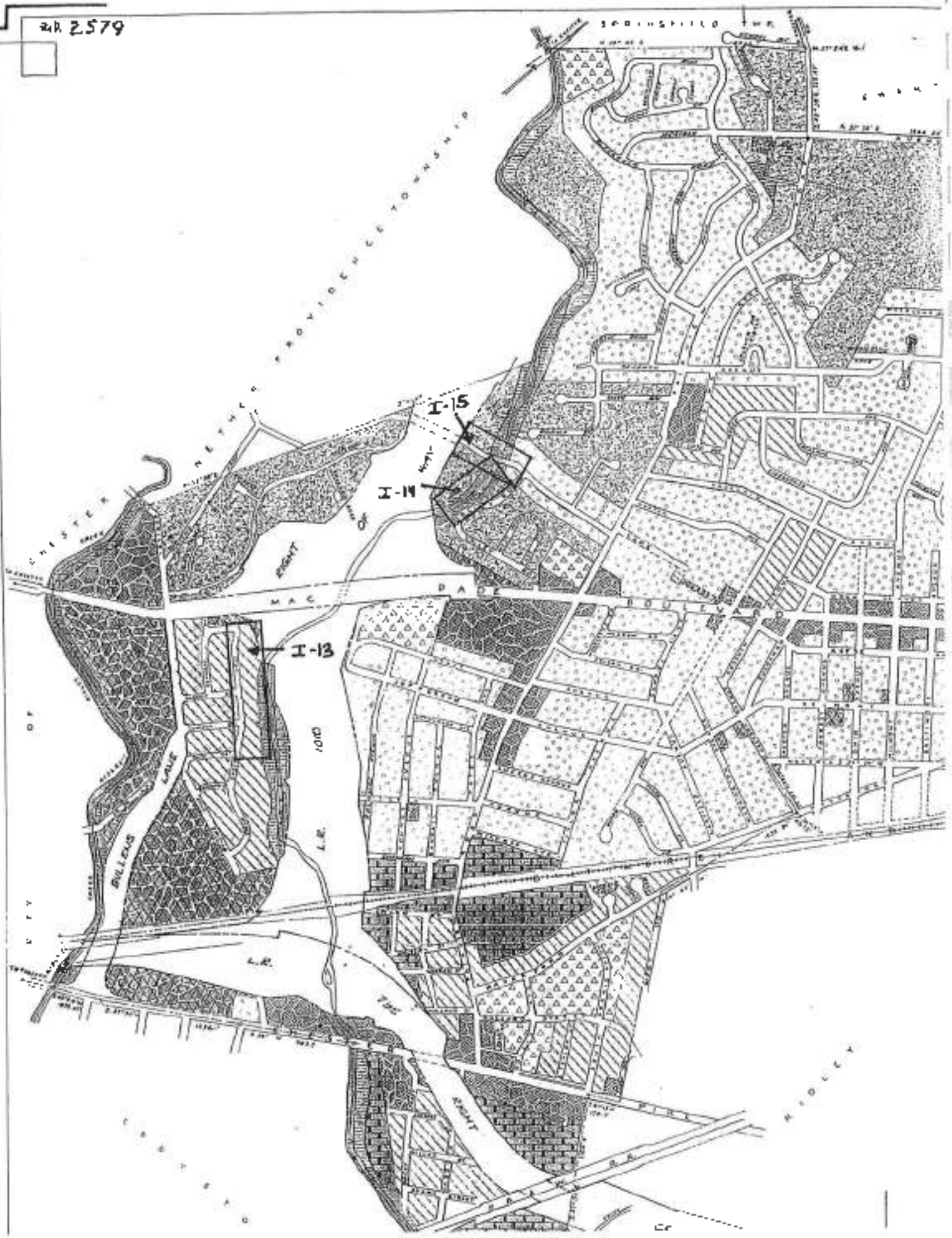
Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
I - 9	Industrial and Residential lower 100 block Youngs St	?	Various Owners	
I - 10	Industrial 200 block Fairview Rd	?	Various Owners	
I - 11	Residential west lower 100 block Morris Ave	1970	Various Owners	
I - 12	Residential east lower 100 block Taylor Ave	1970	Various Owners	
I - 13	Residential east upper 100 and 200 block Drum Creek Drive	1965	Various Owners	most structures are above the flood hazard, yards encroach and experience flooding
I - 14	Residential west upper 1300 block Valley Road	1953	Various Owners	
I - 15	Residential Butlers Lane from Valley Rd west to twp boundary	1955	Various Owners	area roadways frequently flooding
I - 16	Residential east 20 block Haverford Road	1953	Various Owners	
I - 17	Residential and Commercial Motor Ave twp boundary to Mac Dade	?	Various Owners	
I - 18	Apartment and Residential north over 200 and 100 blocks Mac Dade Boulevard	1974	Various Owners	
I - 19	Residential 129 and 131 Marin St	1966	Various Owners	

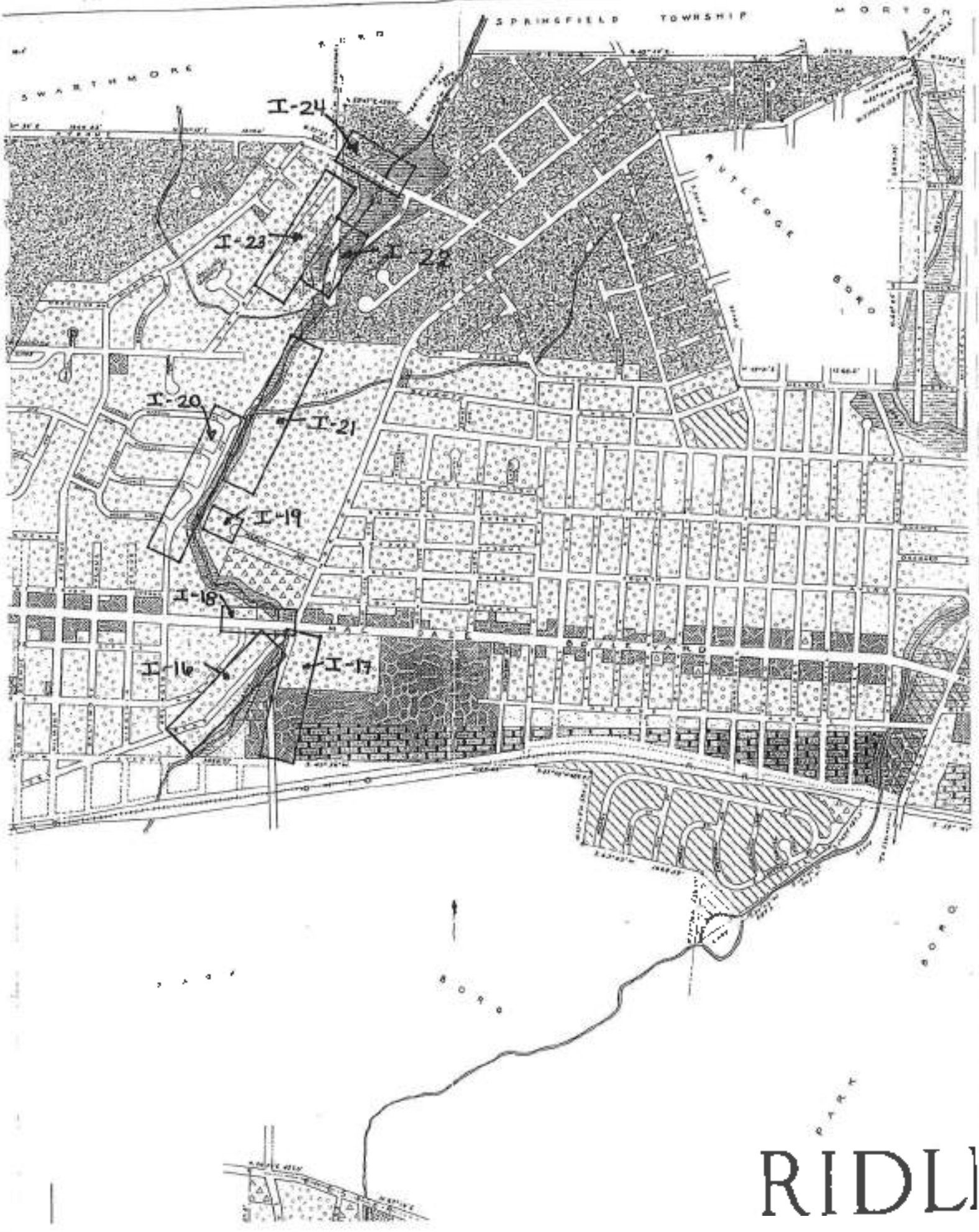
FORM 1

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA FORM 1 SHEET 3 OF 3

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 - 20	Residential east 400 thru 600 blocks Arlington Ave	1951	Various Owners	
1 - 21	Ridley Township High School Morton Ave	1936	Various Owners	structures are above the flood hazard No as encroach floodplain
1 - 22	Residential west 500 block Georgetown Rd	1957	Various Owners	homes often flooded
1 - 23	Residential east 900 and lower 1000 blocks Glenn Avenue	1961	Various Owners	structures above flood hazards, yards encroach floodplain
1 - 24	Residential 300 block Michigan Ave	1957	Various Owners	
1-				no future development is expected in the flood hazard area


I-12
I-11
I-7
I-8
I-9
I-10
I-5
I-4
I-3
I-2
I-1
DELAWARE RIVER


AR 2579
I-15
I-14
I-13
MAC
PA
BULLENS
LANE
ROAD
L.R.
RIGHT

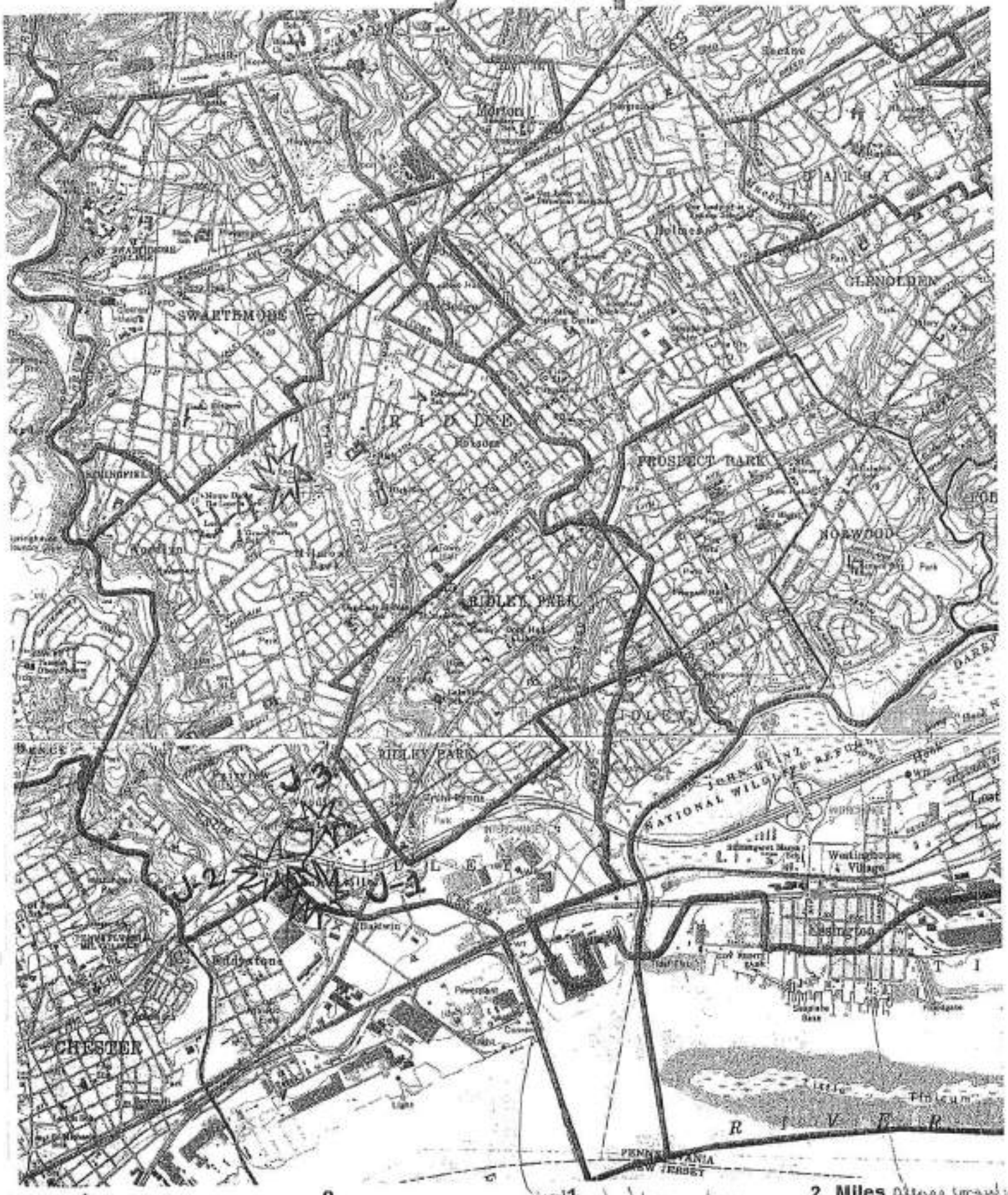

SPRINGFIELD TOWNSHIP
MORTON
SWARTHMORE
I-24
I-23
I-22
I-20
I-21
I-19
I-18
I-16
I-17
RIDL

Form J

WATER QUALITY PROBLEM AREAS FORM J.												SHEET 1 OF 1
WATERSHED						FORM COMPLETED BY						
Name	Crum Creek					Name.	James H. Bricker					
Municipality.	Ridley Township					Telephone:	610-532-2884					
County	Delaware					Date:	8/25/2004					
SITE	J-1	J-2	J-3	J-4	J-	J-	J-	J-	J-	J-	J-	
Types of Water Quality Problems												
High Community Tolerance	X		X									
High Temperature												
High Turbidity												
Hydrocarbon Pollution		?		?								
Low Community Diversity												
Low Dissolved Oxygen												
Low pH												
Nutrient Enrichment												
Poor Habitat	X		X									
Other/Explanation Line No.												
Potential Cause(s)												
Agriculture												
Construction Site												
Erosion												
Lake Discharge												
STP Outfall		X										
Other/Explanation Line No.	1	2	3	4								
Frequency												
Year Most Recent Occurence	2004	2004	2004	2004								
Year First Known Occurence	?	?	?	?								
Source of Information												
County Water Quality Study												
Drivety	X	X	X	X								
Other/Explanation Line No.												

EXPLANATION LINES
1 below Chester pike, lined channel, shopping carts in stream, heavy silt, no visible wildlife
2 orange sediment deposits, oil sheen visible
3 algae and heavy debris in channelized stream
4 orange sediment deposits, foamy film on water surface
5
6
7
8
9
10

Ridley Twp.



please turn this side over



J-1, Baldwin Towers: shopping cart and silt in channel



J-1, Baldwin Towers: lined channel



J-2, Chester Pike: orange deposits



J-2, Chester Pike. orange deposits coming from outfall channel



J-2. Chester Pike: outfall pipe feeding orange channel



J-3, Walter St: concrete channel



J-3, Walter St: heavy debris in channel



J-4, Milmont Ave orange sediment



J-4. Milmont Ave. foam on water surface

Form O - Outfall Data

Person: J. H Bricker Date: 12/04 Time Since Last Rain was > 72 Hours:

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek via Little Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
LCC -1				12" CMP								
LCC -2				18" CMP								
LCC -3												
LCC -4												
LCC -5												
LCC -6												
LCC -7												
LCC -8												
LCC -9												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no corrosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow, plumbing colors, foam, solids, turbidity, oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling (cracked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person. J. H. Bricker Date. 12/04 Time Since Last Rain was > 72 Hours:

Quantity of Last Rain. < 0.1 inches: > 0.1 inches Days Since Last Rain.

Municipality. Ridley Township Name of receiving water. Crum Creek via Little Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (CC:CC) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
LCC -10												
LCC -11												
LCC -12												
LCC -13												
LCC -14												
LCC -15												
LCC -16												
LCC -17												
LCC -18												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (possible dry weather flow, moderate scouring or sediment deposition, some floatables or debris, minor algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person: J H Brucker Date 12/04 Time Since Last Rain was > 72 Hours

Quantity of Last Rain: < 0.1 inches, > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek via Little Crum Creek

Pipe Sample #	Photo #	Storm Drain? Yes/No/ Not sure	Time (military)	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
LCC -19												
LCC -20												
LCC -21												
LCC -22												
LCC -23												
LCC -24												
LCC -25												
LCC -26												
LCC -27												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drop)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person: J. H Brecker Date 12/04 Time Since Last Rain was > 72 Hours*

Quantity of Last Rain < 0.1 inches* > 0.1 inches Days Since Last Rain.

Municipality: Ridley Township Name of receiving water. Crum Creek via Little Crum Creek

Pipe Swale #	Photo #	Storm Drain* Yes-No Not sure	Time (00.00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color-Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
LCC -28												
LCC -29												
LCC -30												
LCC -31												
LCC -32												
LCC -33												
LCC -34												
LCC -35												
LCC -36												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no discoloration or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data Cont'd

Person: J. H. Bricker Date: 12-04 Time Since Last Rain was > 72 Hours

Quantity of Last Rain: < 0.1 inches, > 0.1 inches Days Since Last Rain:

Municipality: Ridley Township Name of receiving water: Crum Creek via Little Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes? (H:V)	Flow Observed (Yes or no)	Write: Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
LCC -37												
LCC -38												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no deposition or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basin or drain)

H/V = Horizontal to vertical ratio

1:1 = Vertical - rectangular channel

NOTES:

FORM A - STORM WATER PROBLEM AREAS SHEET 1 OF 1

CRUM CREEK WATERSHED	FORM COMPLETED BY	Before Filling Out Form, See Instructions On Back
Name:	Name: C.J. Catania Jr	
Municipality: Ridley Township	Telephone: 610-532-2884	For County Use:
County: Delaware	Date: July30,2003	

MAP NO. *	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-	A-
Types of Storm Water Problems												
Flooding			x	x	x	x	x			x		
Accelerated Erosion		x			x	x	x	x	x	x		
Sedimentation	x					x						
Landslide												
Groundwater												
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)	1	2	3	6	7	8	9	10	11	12		
Cause (s)												
Storm Water Volume			x	x	x	x	x			x		
Storm Water Velocity		x			x	x	x	x	x			
Storm Water Direction		x			x	x	x	x				
Water Obstruction			x		x	x	x			x		
Other (Explain)												
Explanation Line No. (On Back)			4									
Frequency												
Year Most Recent Occurred			2003	2002	2003	2002	2003			2002		
Year First Known Occurred			?	?	?	?	?					
Regularity												
More Than 1 Year							x					
Less Than 1 Year			x	x	x	x				x		
Only During Agnes or Floyd												
Duration (If Applicable)												
Less Than 1 Day			x	x	x	x	x			x		
1 Day + (Enter Days)												
Property Damage												
Loss of Life/Vital Services			x									
Private		x			x	x	x	x	x	x		
More Than One Owner		x			x	x	x	x	x	x		
Types of Properties		R		Ind	R	R	R	R	R	R/C		
Number of Properties		5		1	6	20	8	12	4	9		
Public (List Types)												
Explanation Line No. (On Back)			5									
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed												
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities.

Begin with A-1 as the first map number to identify the first storm water problem area. Locate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)". Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.



Use the explanation lines to list the types of public property damages ,e.g.roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for this proposed facilities.

Definitions

Storm Water Problem Area
An area that defines the furthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

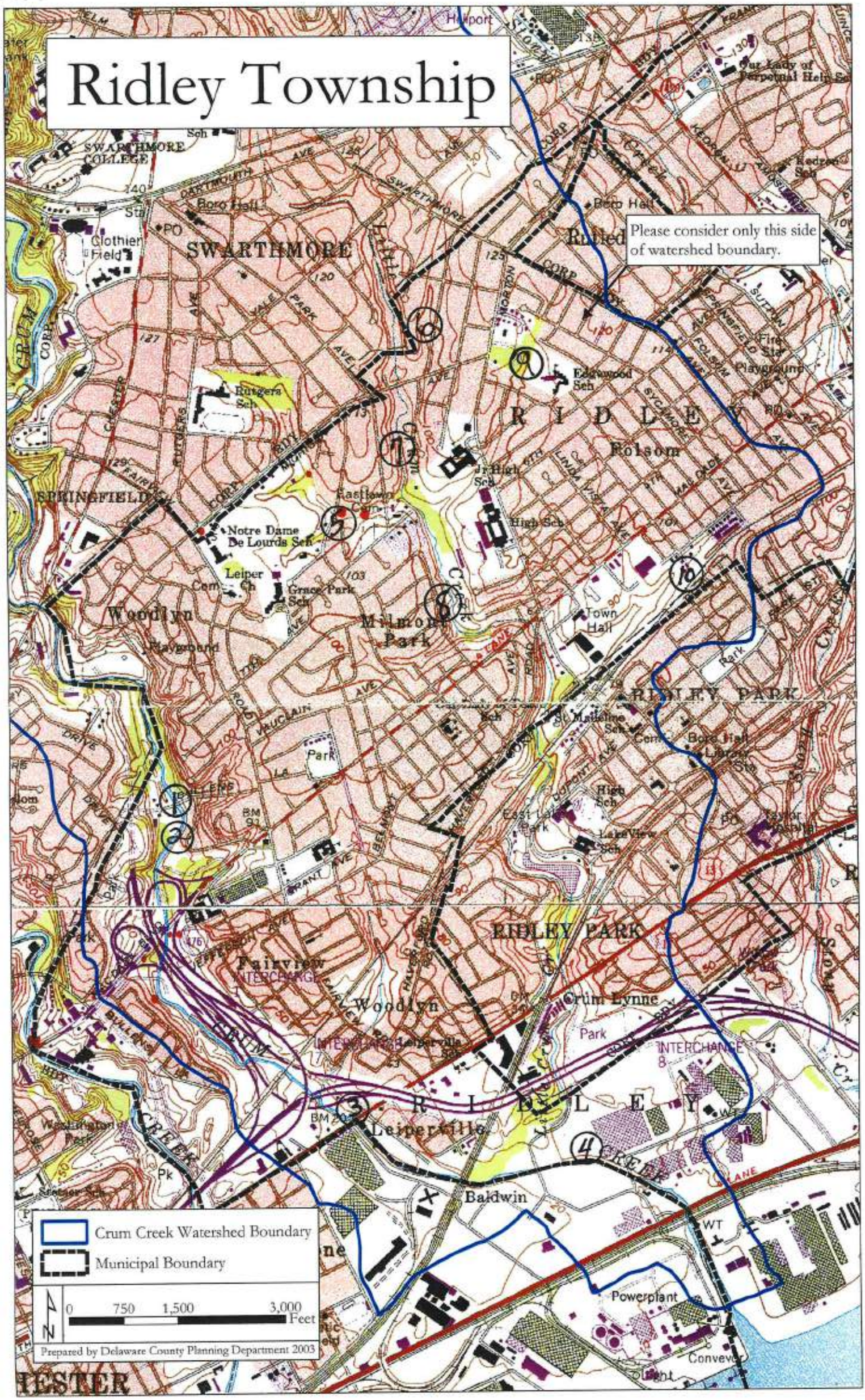
Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials transported by surface water is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, wall, wingwall, fill, stairway, weir, dam, excavation, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

1 PennDOT installed flood cell that accumulates sedimentation decreasing flood cell capacity
2 Streambank erosion along rear of homes on Valley Rd
3 Chester Pike flooding
4 culvert under Chester Pike
5 Chester Pike closed to traffic during flooding
6 Boeing Industrial facility flooding
7 Milmont Avenue near Brookside Lane flooding & erosion
8 Muhlenberg Ave flooding and erosion
9 Georgetown Rd flooding and erosion
10 Ridley High School/Arlington Ave erosion
11 Edgewood Ave erosion
12 2nd Ave flooding


Ridley Township
Please consider only this side of watershed boundary.
SWARTHMORE
SWARTHMORE COLLEGE
Clothier Field
Rutgers Sch
SPRINGFIELD
Notre Dame De Lourds Sch
Leiper Ch
Leiper Cem
Grace Park Sch
Woodlyn
Woodlyn Playground
Millmont Park
Eastlown Cem
Jr High Sch
High Sch
Edgewood Sch
Fire Sta
Playground
Folsom
RIDLEY
RIDLEY PARK
Town Hall
Bore Hall
Library
St Madeleine Sch
Cem
Lake View Sch
East Lake Park
Taylor Memorial
Fairview
INTERCHANGE
Crum Lynne
Park
INTERCHANGE 8
Leiperville
Leiperville Sch
Baldwin
Powerplant
Conveyor
Crum Creek Watershed Boundary
Municipal Boundary
0 750 1,500 3,000 Feet
Prepared by Delaware County Planning Department 2003

RUTLEDGE BOROUGH

Turning Ideas Into Reality

CATANIA ENGINEERING ASSOCIATES, INC.

Consulting Engineers & Land Surveyors

May 19, 2005
File No. 83350-115

Karen Holm
Delaware County Planning Department
Court House & Government Center Building
201 West Front Street
Media, PA 19063

RE: Crum Creek, Act 167
Rutledge Borough

Dear Karen:

Enclosed, please find the following:

1. Act 167 Municipality Questionnaire
2. Zoning Ordinance
3. Zoning Map
4. SLDO
5. Map of Storm Sewer System

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

Charles J. Catania, Jr. PE
for Catania Engineering Associates, Inc.

CJC, Jr/pm
Enclosures
cc: Ed McGaughey

520 W. MacDade Boulevard, Milmort Park, Pennsylvania 19033-3311
Phone: (610) 532-2884 Fax: (610) 532-2925 E-Mail: CEAINC1@aol.com

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: Rutledge Borough

Contact Person: Edward O. Montgomery

WPAC Designee: Charles J. Cotter, Jr.

Title: Township Engineer

Address: 500 W. Baltimore Pike

Media, PA 19063-3211

Phone: 610-566-2211

Fax: 610-566-4783

Person Completing form (if different from Contact Person):

Name: Charles J. Cotter, Jr. & Christine Fazi

Address: 500 W. Baltimore Pike

Media, PA 19063-3211

Phone: 610-566-2211

Fax: 610-566-4783

E-mail:

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance		
Subdivision/Land Development Ordinance		
Separate Stormwater Ordinance		
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors				
Municipal Engineering Department				
Municipal Planning Department				
County Planning Department				
County Conservation District				
Zoning Hearing Board				
Consulting Engineer				
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below.

Zoning ordinance
Land subdivision ordinance

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	✓		
Comprehensive Land Use Plan		✓	
Existing Land Use Maps		✓	
Proposed Land Use Maps		✓	
Zoning Maps	✓		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	Y
Participates in FEMA Emergency Program	Y
Participates in FEMA Regular Program	Y

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

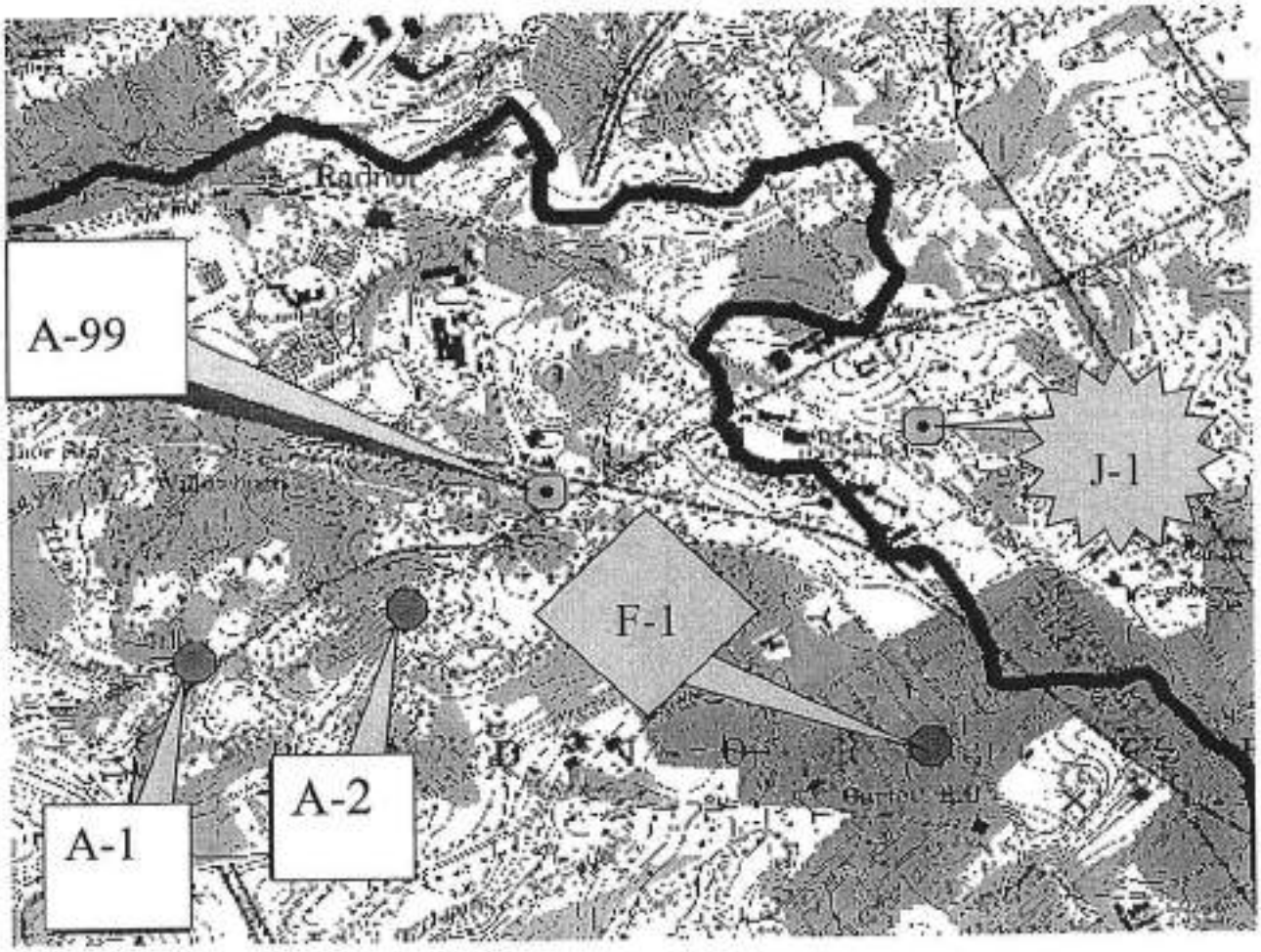
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



FORM DESCRIPTION SUMMARY
ACT 167 WATERSHED STORMWATER MANAGEMENT PLAN

Form	Symbol	Description	Types of Examples	Sources of Information
A		Stormwater Problem Areas	Flooding, Drainage, Erosion/Sedimentation	Existing studies or reports, Township Documentation, Personal memory, Township engineer
B		Obstructions	Bridges, Culverts, Fill, Structures	Owner or structure, township files, subdivision applications, roadmaster, township engineer
C		Existing Flood Control Projects	Channel excavation, rip rap, floodwalls, etc.	Township records, township engineer, owner of facility
D		Proposed Flood Control Projects	Channel excavation, rip-rap, floorlwalls, etc.	Township records, township engineer, owner of facility
E		Existing Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivison files, township engineer, owner of facility
F		Proposed Stormwater Control Facilities	Detention basins, recharge basins, roof-top stroage	Subdivision files, township engineer, owner of facility
G		Existing Stormwater Collection Systems	Storm sewers, man-made channels, diversions	Existing plans, township engineer, owner of system
H		Proposed Stormwater Collection Systems	Storm sewers, man-made channels, diversions	Existing plans, township engineer, owner of system
I		Present & Projected Development in Flood Hazard Areas	Subdivision / site plans	Flood Insurance Studies, Subdivision / Site Plans, General knowledge, Township engineer, Private flood studies
J		Water Quality Problem Areas	Construction sites, agriculture	Municipalities, Conservation District

Turning Ideas Into Reality

CATANIA ENGINEERING ASSOCIATES, INC.

Consulting Engineers & Land Surveyors

February 26, 2004
File No. 03350-115-W

Justin D. Kauffman
Delaware County Planning Department
Government Center
201 W. Front Street
Media PA 19063-2751

Re Rutledge Borough
Darby - Cobbs Creek Act 167 Stormwater Management Plan
Crum Creek Act 167 Stormwater Management Plan

Dear Mr. Kauffman:

Enclosed please find completed Form O - Outfall Data for the above referenced projects. Please note that there are no outfalls in the Borough. A map of the storm sewer system is attached.

Should you have any questions or comments, please feel free to contact me.

Very truly yours,

Jamie H. Wenger

Jamie H. Wenger EIT
for Catania Engineering Assoc. Inc.

JHW/drl
Enclosure
cc: Rutledge Borough

527 W. MacDade Boulevard Milmont Park, Pennsylvania 19033-3911
Phone: (610) 532-2884 Fax: (610) 532-2923 E-Mail: CEAINC1@aol.com

Form A

		STORM WATER PROBLEM AREAS FORM A.						SHEET \ OF \					
WATERSHED			FORM COMPLETED BY					Before Filling Out Form,					
								See Instructions On Back					
Name:	[illegible]		Name:	[illegible]									
Municipality:	[illegible]		Telephone:	[illegible]				For County Use:					
County:	[illegible]		Date:	[illegible]									
MAP NO. *		A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems													
Flooding					[illegible]								
Accelerated Erosion													
Sedimentation													
Landslide													
Groundwater													
Water Pollution													
Other (Explain)													
Explanation Line No. (On Back)													
Cause (s)													
Storm Water Volume													
Storm Water Velocity													
Storm Water Direction													
Water Obstruction													
Other (Explain)													
Explanation Line No. (On Back)													
Frequency													
Year Most Recent Occurred													
Year First Known Occurred													
Regularity													
More Than 1 Year													
Less Than 1 Year													
Only During Agnes													
Duration (If Applicable)													
Less Than 1 Day													
1 Day + (Enter Days)													
Property Damage													
Loss of Life/Vital Services													
Private													
More Than One Owner													
Types of Properties													
Number of Properties													
Public (List Types)													
Explanation Line No. (On Back)													
Solutions													
Suggested													
Explanation Line No. (On Back)													
Formally Proposed													
Explanation Line No. (On Back)													

* Include Map ID No. if found on any other form listing proposed facilities.

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (√) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)". Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.

Use the explanation lines to list the types of public property damages ,e.g.roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities.



Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, wall, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water.

EXPLANATION LINES (continued)

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: [illegible]	Name: Christine Beck	Channel Excavation / Widening	Levee	Dams
Municipality: [illegible]	Telephone: (610) 582-2814	Channel Realignment	Gabions	Floodwall
County: [illegible]	Date: 5/18/05	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C-						
C-						
C-						
C-						
C-						

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS
Name:	Name:	Channel Excavation / Widening; Channel Realignment; Rock Riprap; Levee; Gabions; Pipe Channel; Dams; Floodwall; Concrete Lining
Municipality:	Telephone:	
County:	Date:	

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complin. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S.		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: [illegible]	Name: [illegible]	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
Municipality: Berkeley	Telephone: [illegible]	
County: [illegible]	Date: [illegible]	
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-	NONE			
E-				
E-				
E-				
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED FLOOD CONTROL PROJECT FORM F. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY
Name: Bear Creek	Name: [illegible]
Municipality: [illegible]	Telephone: [illegible]
County: [illegible]	Date: [illegible]

DEFINITION

Storm Water Control Facility

A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates		Map No. Form A*	Contact Person Name, Address and Phone	Comments
		Start	End			
F-	[illegible]					
F-						
F-						
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin	Roof-Top Storage
Natural Pond or Wetland	Semi-Pervious Paving
Parking Lot Ponding	Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (Front)

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET 1 OF 1

WATERSHED: Crum Creek

FORM COMPLETED BY
Name: [illegible]
Telephone: [illegible]
Date: [illegible]

Municipality: [illegible]
County: [illegible]

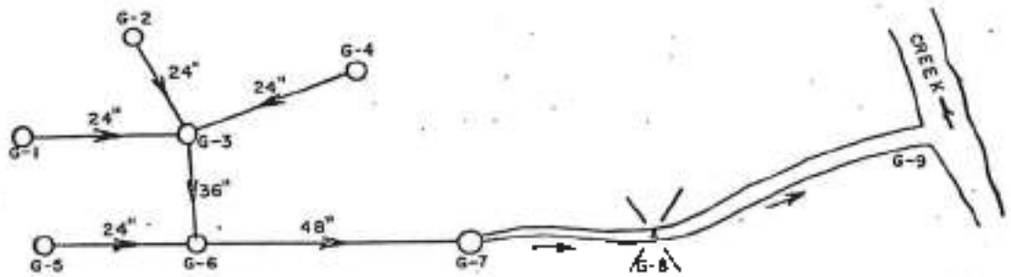
INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

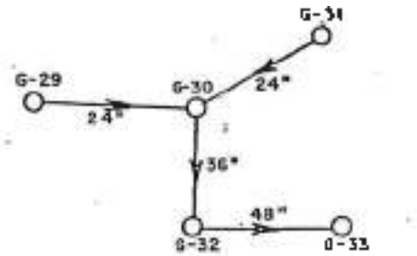
Map I.D. No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-	None											
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

Measurement Key
D = Diameter TW = Top Width B = Bottom Width

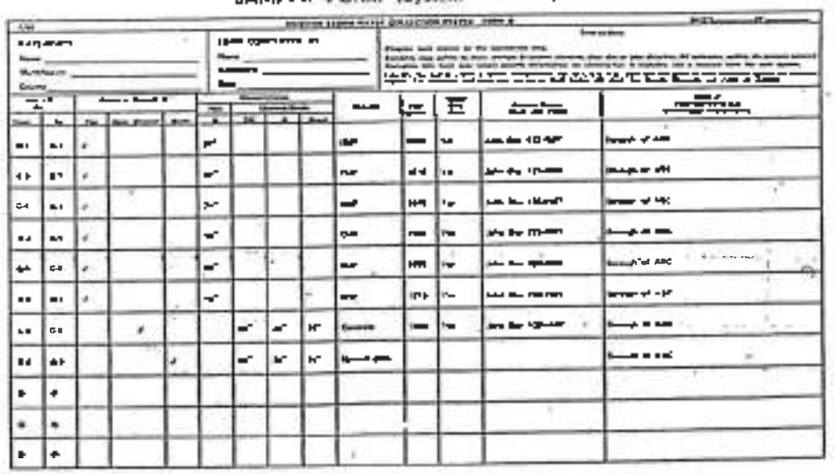


SAMPLE DIAGRAM FOR SYSTEM ONE



SAMPLE DIAGRAM FOR SYSTEM TWO

SAMPLE FORM (System One Only)





Outline known areas where construction exists but construction data is unavailable.

FORM H (Front)

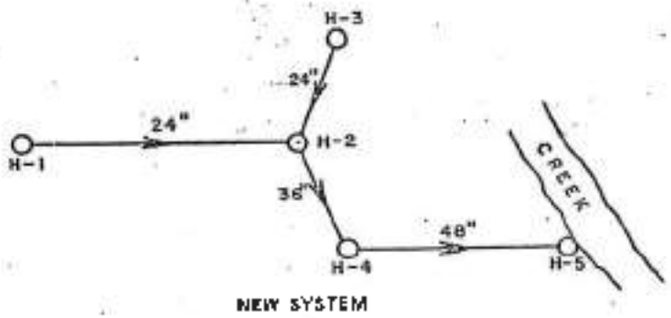
PROPOSED FLOOD CONTROL PROJECT FORM H. SHEET ___ OF ___

WATERSHED			FORM COMPLETED BY			INSTRUCTIONS											
						On this map for proposed storm water collection systems, diagram each proposed system. Indicate a map point to show changes in system elements, plus size, pipe direction and connections											
Name:			Name:			to existing systems. For proposed additions to existing systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed,											
Municipality:			Telephone:			new system and one for each existing system having one or more proposed additions. Identify the points within a system consecutively (ex. H-1, H-2, H-3). Start the first point in each											
County:			Date:			additional system 20 numbers higher (if H-3 ends one system, begin the next with H-20.) Be sure to show the point where proposed additions connect into existing systems, using the map											
						point number from the existing system form and map. See Sample Diagram and Form on Reverse.											
Map I.D. No.		System's Elements (x)			Measurements *					Map I.D	Proposed		Design	Contact Person	Name of Final		
					Pipe	Open Channel / Swale			Material	Nos.**	Const. Dates		Data	Name and	Ownership and		
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Avail	Phone	Maintenance Responsibility		
H-	H-																
H-	H-																
H-	H-																
H-	H-																
H-	H-																
H-	H-																
H-	H-																
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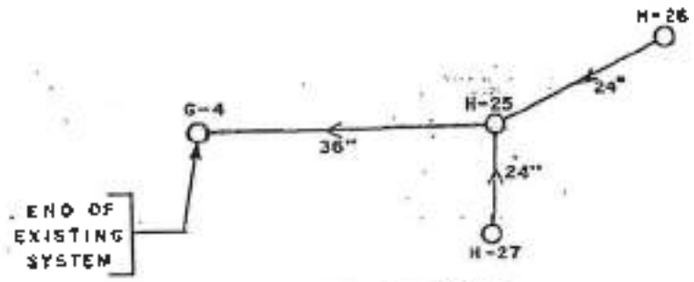
* See measurement key on reverse side. ** Enter the storm water problem areas' Map I.D. Nos., if proposed project will solve or reduce any / all of the drainage problems.

SAMPLE DIAGRAMS

Measurement Key
D = Diameter TW = Top Width B = Bottom Width

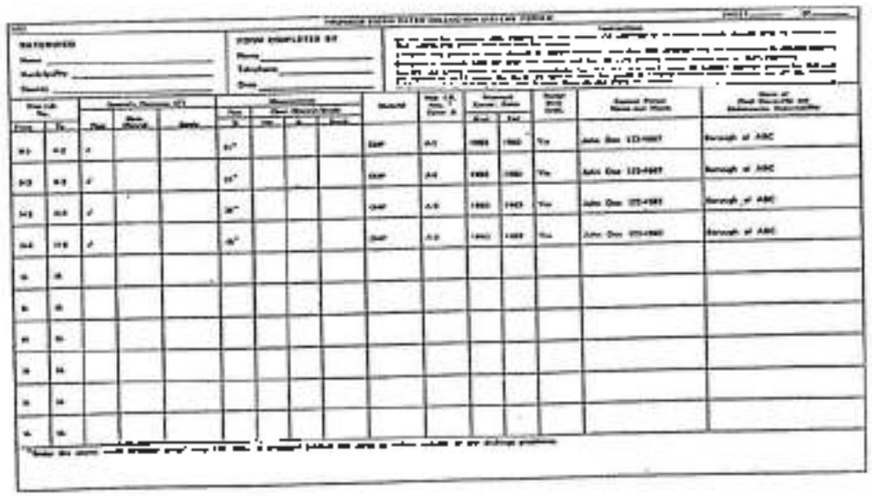


NEW SYSTEM



ADDITION TO EXISTING SYSTEM

SAMPLE FORM (New System Only)



FORM I

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET ' OF '

WATERSHED

FORM COMPLETED BY

Name:

Municipality:

County.

Name:

Telephone:

Date:

For County Use:

DEFINITION

FLOOD HAZARD AREA:

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD.

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				
1 -				

Form J

		WATER QUALITY PROBLEM AREAS FORM J. SHEET 1 OF 1											
WATERSHED					FORM COMPLETED BY								
Name:					Name:								
Municipality:					Telephone:								
County:					Date:								
SITE		J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems													
High Community Tolerance													
High Temperature													
High Turbidity													
Hydrocarbon Pollution													
Low Community Diversity													
Low Dissolved Oxygen													
Low pH													
Nutrient Enrichment													
Poor Habitat													
Other/Explanation Line No.													
Potential Cause(s)													
Agriculture													
Construction Site													
Erosion													
Lake Discharge													
STP Outfall													
Other/Explanation Line No													
Frequency													
Year Most Recent Occurrence													
Year First Known Occurrence													
Source of Information													
County Water Quality Study													
Drive-by													
Other/Explanation Line No.													
		EXPLANATION LINES											
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Form O - Outfall Data

Person: Jamie H. Wenger Date: 2/25/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches ≥ 0.1 inches Days Since Last Rain: One (2/24/04)

Municipality: Rutledge Borough Name of receiving water: Darby Creek via Stoney Creek via Ridley Township System

Pipe Swale #	Photo #	Storm Drain? Yes/No Not Sure	Time (00:00: am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color Odor (specify if floatables algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
None												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking for possible weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2 Impairment needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*H:V = Vertical - no ratio for channel

NOTES:

Rutledge Borough Storm Sewer System is tied into Ridley Township's System, two outfalls on Stoney Creek outside of the Borough boundary convey storm water from within the Borough

Form O - Outfall Data

Person: Jamie H. Wenger Date: 2/25/04 Time Since Last Rain was > 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain: One (2/24/04)

Municipality: Rutledge Borough Name of receiving water: Crum Creek

Pipe, Swale #	Photo #	Storm Drain? Yes/No/ Not sure	Time (EST) #/Pipe	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color, Odor, (specify if floatables, algae, or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
None												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs monitoring (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, o.k., algae, pipe in poor condition)

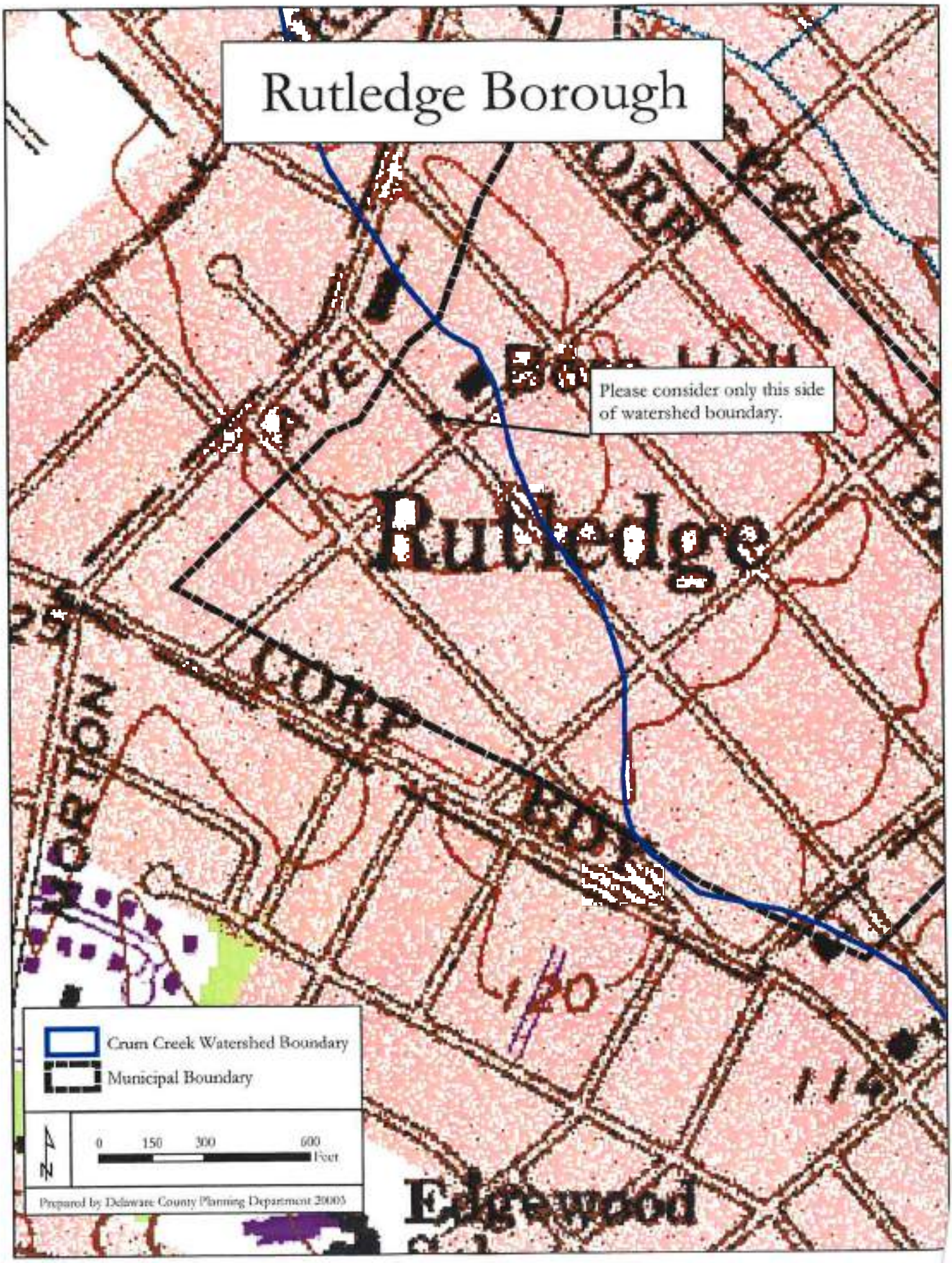
2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked outlet basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Rutledge Borough does not have any storm sewers or appurtenances connecting to outfalls on Crum Creek or in the Watershed


Rutledge Borough
Please consider only this side of watershed boundary.
Rutledge
CORP
RD
MORTON
Crum Creek Watershed Boundary
Municipal Boundary
N
0 150 300 600
Feet
Prepared by Delaware County Planning Department 2000
Edgewood

Form O - Outfall Data

Person: Jamie H Wenger Date: 2.25'04 Time Since Last Rain was > 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 Inches: > 0.1 inches Days Since Last Rain One (2/24/04)

Municipality: Rutledge Borough Name of receiving water: Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (HH:MM) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes? (H:V)	Flow Observed (Yes or no)	Water Color/Odor (spec. if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
None												

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or discoloration, considerable sediment deposition, algae or debris, pipe is dilapidated or crumbling, blocked outfall pipe or drain)

[H:V = Horizontal to vertical ratio

(1:1) = Vertical - rectangular channel

NOTES:

Rutledge Borough does not have any storm sewers or appurtenances connecting to outfalls on Crum Creek or in the Watershed

SPRINGFIELD TOWNSHIP

Pennoni

PENNONI ASSOCIATES INC.
CONSULTING ENGINEERS

SPTW 0402
(SPTW 0500.04)

September 9, 2005

Ms. Karen Holm
Delaware County Planning Department
Government Center Building
201 West Front Street
Media, PA 19063

Re: Springfield Township, Delaware County
Crum Creek Watershed Act 167 Stormwater Management Plan - Phase II

Dear Ms. Holm:

In accordance with the Act 167 Stormwater Management Plan for the Crum Creek Watershed, please accept the attached municipal survey forms on behalf of Springfield Township, Delaware County.

Should you have any questions or comments, please feel free to contact the undersigned.

Very truly yours,

PENNONI ASSOCIATES INC.

Joseph Mastronardo, P.E.
Project Engineer

cc: Michael T. LeFevre, Township Manager, w/enclosure

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us.

PART I - GENERAL INFORMATION

Municipality: Springfield Township

Contact Person: Michael T. LeFevre, Township Manager

WPAC Designee: Joseph A. Mastronardo, P.E.

Title: Township Consulting Engineer

Address: Pennoni Associates, Inc.

3001 Market Street, Philadelphia, PA 19104

Phone: (215) 222-3000 x3545

Fax: (215) 222-0598

Person Completing form (if different from Contact Person):

Name: Joseph A. Mastronardo, P.E.

Address: Pennoni Associates, Inc.

3001 Market Street, Philadelphia, PA 19104

Phone: (215) 222-3000 x3545

Fax: (215) 222-0598

E-mail: jmastronardo@pennoni.com

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	X	
Subdivision/Land Development Ordinance	X	
Separate Stormwater Ordinance	X	
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors		X		X
Municipal Engineering Department				
Municipal Planning Department	X (Codes Dept.)		X	
County Planning Department	X			
County Conservation District	X			
Zoning Hearing Board				X
Consulting Engineer	X		X	
Others (List Below				

C. Please provide copies of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below:

Chapter 123 – Subdivision and Land Development

Chapter 143 - Zoning

Ordinance No. 1429 – Stormwater Management

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	APPROVED		
Comprehensive Land Use Plan	APPROVED/1983		
Existing Land Use Maps	APPROVED/1983		
Proposed Land Use Maps	APPROVED/1983		
Zoning Maps	APPROVED/1985		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	YES
Participates in FEMA Emergency Program	YES
Participates in FEMA Regular Program	YES

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY. The process would be as follows starting with the problem areas (Form A).

- Place the location of the problem area on the map as shown in the attached example map.
- Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

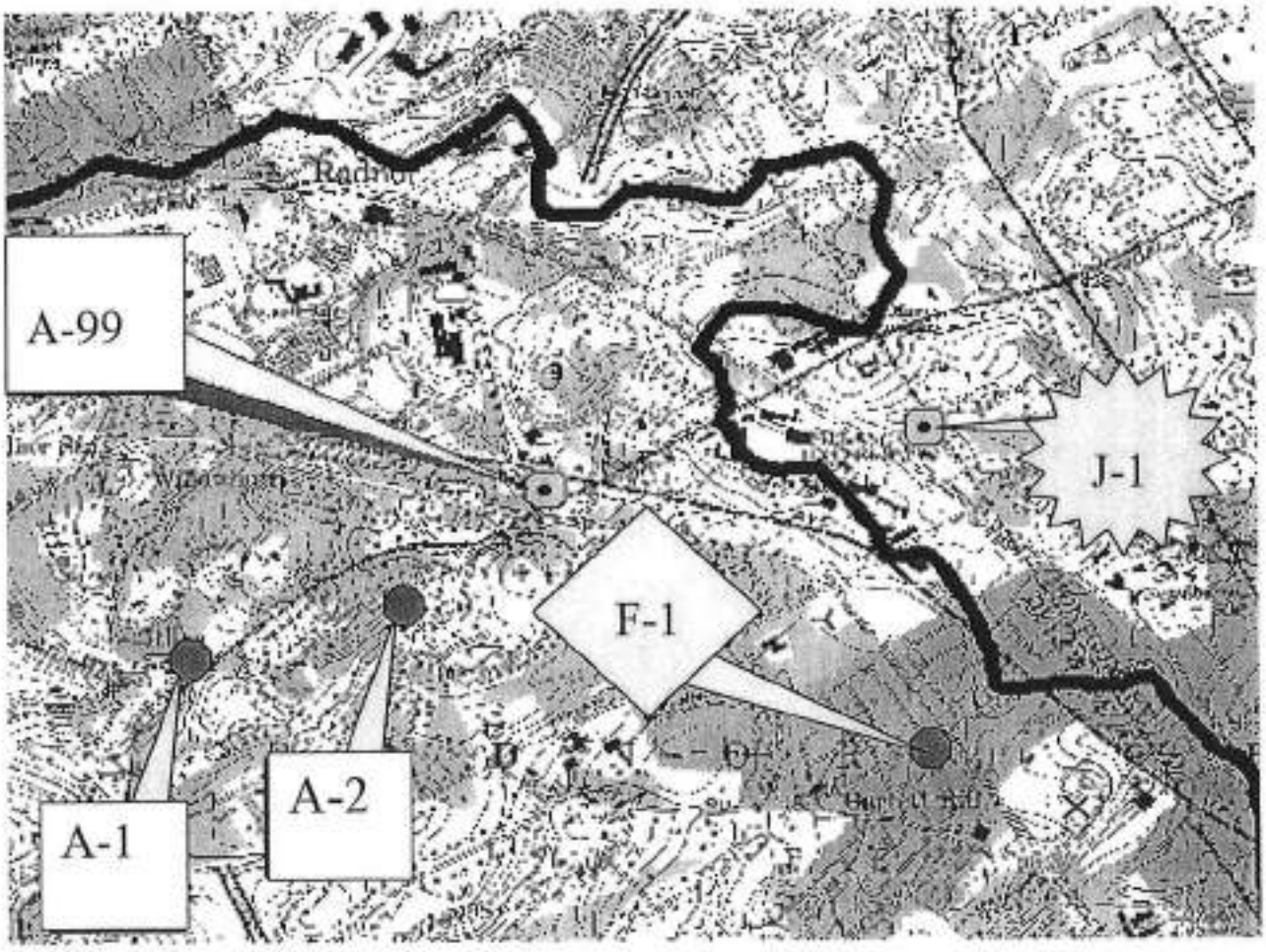
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



Form A

		STORM WATER PROBLEM AREAS FORM A. SHEET 1 OF 1												
WATERSHED			FORM COMPLETED BY					Before Filling Out Form, See Instructions On Back						
Name:	Crum Creek		Name:		Joseph Mastromarco									
Municipality:	Springfield Twp		Telephone		(215) 222-3000			For County Use.						
County:	Delaware Cty		Date:		7/18/2005									
MAP NO. *		A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	
Types of Storm Water Problems														
Flooding														
Accelerated Erosion														
Sedimentation														
Landslide														
Groundwater														
Water Pollution														
Other (Explain)														
Explanation Line No. (On Back)														
Cause (s)														
Storm Water Volume														
Storm Water Velocity														
Storm Water Direction														
Water Obstruction														
Other (Explain)														
Explanation Line No. (On Back)														
Frequency														
Year Most Recent Occurred														
Year First Known Occurred														
Regularity														
More Than 1 Year														
Less Than 1 Year														
Only During Flood														
Duration (If Applicable)														
Less Than 1 Day														
1 Day + (Enter Days)														
Property Damage														
Loss of Life/Vital Services														
Private														
More Than One Owner														
Types of Properties														
Number of Properties														
Public (List Types)														
Explanation Line No. (On Back)														
Solutions														
Suggested														
Explanation Line No. (On Back)														
Formally Proposed														
Explanation Line No. (On Back)														
* Include Map ID No. if found on any other form listing proposed facilities.														

NOT APPLICABLE

Spring Run (SPR)

FORM B - OBSTRUCTION DATA COLLECTION

SHEET 10 OF _____

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Springfield / Delaware

Records completed by: Erin Fuss

Field work personnel: _____

Date(s): 12/1 - 12/22

Tw Amount of fill	Watsuki		Inlet Conditions
D= Diameter	masy = Stone Masonry Structure	HW = Headwall	
HT = Height	CMP = Corrugated Metal Pipe	WW = Wingwall	
W = Width	CPP = Corrugated Polyethylene Pipe	SW = Sidewall	
PW = Pier Width	BCDMP = Bituminous Coated CMP		
	RCP = Reinforced Concrete Pipe		
	SP = Steel Pipe		

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert □	Culvert ○	Culvert ○	Bridge ⌒	Bridge □	Measurements: T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
SPR 1	Country club Rd		1				✓				4	4.5	–	–	–	90		
SPR 2	Lewis Rd		1				✓				7.5	3	–	–	–	90		
SPR 3	[illegible]		2	✓						✓	1	–	6.5	18	–	90		
SPR 4	[illegible]		2	✓		1	1				2	2	4	18	–	90		Duplicate
SPR 5	[illegible]		1				✓				3.5	4.5	–	–	–	90		–
SPR 6	[illegible]		1	✓						✓	6.5	–	3	4.5	–	90		
SPR 7	[illegible]		1	✓						✓	2	–	2	17	–	90		
SPR 8	[illegible]		1	✓		✓					2	–	2	17	–	90		
SPR 9	[illegible]		1	✓						✓	2	–	2	18	–	90		
SPR 10	[illegible]		1			✓					2	–	4	18	–	90		
SPR 11	[illegible]		1	✓						✓	4	–	4	21	–	90		
SPR 12	[illegible]		1			✓					4	–	4	4	–	90		
SPR 13	[illegible]		1	✓						✓	4.5	–	4.5	4	–	90		estimate
SPR 14	[illegible]		1	✓						✓	18	–	5	14	–	90		
SPR 15	[illegible]		1	✓						✓	6.5	–	3.5	8	–	90		
SPR 16	[illegible]		1	✓						✓	12	–	4.5	18	–	90		
SPR 17	[illegible]		1	✓														No Obs
SPR 18	[illegible]		1	✓						✓	7	–	4.5	15	–	45		
SPR 19	[illegible]		1	✓						✓	1.5	–	4	22	–	90		No Obs
SPR 20	[illegible]		1				✓				3.5	3	–	–	–	45	RCP	
SPR 21	[illegible]																	No Obs
SPR 22	[illegible]																	No Obs

L:\GISData\Misc-stormwater\Act167DOCS\DataCollectionForms\dbsforms.xls

FORM C

EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY		TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name:	Crum Creek	Name:	Joseph Mastronardo	Channel Excavation / Widening	Levee	Dams
Municipality:	Springfield Township	Telephone:	(215) 222-3000	Channel Realignment	Gabions	Floodwall
County	Delaware County	Date:	7/18/2005	Rock Riprap	Pipe Channel	Concrete Lining

For County Use.

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C-						
C-						
C-						
C-						
C-						

NOT APPLICABLE

FORM D

PROPOSED FLOOD CONTROL PROJECT FORM D. SHEET OF

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: Crum Creek	Name: Joseph Mastronardo	Channel Excavation / Widening	Levee	Dams
Municipality: Springfield Township	Telephone: (215) 222-3000	Channel Realignment	Gabions	Floodwall
County: Delaware County	Date: 7/18/2005	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Study Phase Begun			Year Constr. Planned	Projected Complth. Date	Expected Life Yrs.	Design Flood		Map ID No. Form A*	Owner Name, Address, and Phone
		YES		NO				Frequency Yrs.	Discharge C.F.S		
		Prelim.	Final								
D-											
D-											
D-											
D-											
D-											

NOT APPLICABLE

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: _____ Municipality: _____ County: _____	Name: _____ Telephone: _____ Date: _____	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-1	Detention Basin		Frank Pappa	Lincoln Ave. and Millison Dr.
E-2	Detention Basin		Frank Pappa	Capie Polk Dr. and Millison Dr.
E-3	Detention Basin		Frank Pappa	Farmhouse Cr. and Swarthmore Ave.
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM F

PROPOSED FLOOD CONTROL PROJECT FORM F.

SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Joseph Mastronardo
Municipality:	Springfield Township	Telephone:	(215) 222-3000
County:	Delaware County	Date:	7/18/2005

DEFINITION

Storm Water Control Facility

A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites

For County Use:

Map ID No.	Type of Storm Water Control Facility	Proposed Constr. Dates Start	End	Map No. Form A*	Contact Person Name, Address and Phone	Comments
F-1	Subsurface Detention / Infiltration Basin	Jul-2005	Jul-2006		Springfield Township Michael LeFevre, Township Manager	Willow Bay Subdivision Route 320 & Beatty Road
F-2	Subsurface Detention / Infiltration Basin	Constructed, Pending Dedication			Springfield Township Michael LeFevre, Township Manager	Springfield Chase Subdivision Beatty Road & Kelli Lane
F-3	Subsurface Detention / Infiltration Basin	Constructed, Pending Dedication			Springfield Township Michael LeFevre, Township Manager	Springfield Chase Subdivision Beatty Road & Kelli Lane
F-						
F-						
F-						
F-						
F-						

* Enter the storm water problem area's Map ID No., if the proposed project will solve or reduce any / all of an identified drainage problem.

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

- Detention / Retention Basin
- Natural Pond or Wetland
- Parking Lot Ponding
- Roof-Top Storage
- Semi-Pervious Paving
- Infiltration Device (Seepage / Recharge Basin or Underground Tank)

FORM G (Front)

EXISTING FLOOD CONTROL PROJECT FORM G. SHEET ____ OF ____

WATERSHED		FORM COMPLETED BY		INSTRUCTIONS
				Diagram each system on the appropriate map. Establish map points to show changes in system elements.
Name:	Crum Creek	Name:	Joseph Mastronardo	pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific
Municipality:	Springfield Twp	Telephone:	(215) 222-3000	information on construction is available. Use a separate form for each system. Identify the points within a
County:	Delaware	Date:	8/29/2005	system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher.
				For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *						Design		Name of Final
					Pipe	Channel / Swale			Material	Year	Data	Contact Person	Ownership and
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Constr.	Available	Name and Phone	Maintenance Responsibility
G-	G-												
G	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

SEE ATTACHED MAPPING

* See measurement key on reverse side.

Crum Creek Stormsewers

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1297		22-22C 4' GRATE	22-22C 4' GRATE	1986	15" CMP/PVC	118'	CRUM CREEK
	1270		23-79C M.H.	23-80C M.H.	1990	18" RCP	17'	CRUM CREEK
	1271		23-84C TYPE M IN	23-83C M.H.	1992	15" RCP/PVT	160'	CRUM CREEK
	1272		23-81C TRENCH IN	23-83C M.H.	1992	18" CMP/PVT	166'	CRUM CREEK
	1273		23-83C M.H.	23-82C TYPE M IN	1992	16" RCP/PVT	24'	CRUM CREEK
	1274		23-82C TYPE M IN	23-59C M.H.	1992	18" RCP/PVT	9'	CRUM CREEK
	1277		19-136C M.H.	19-137C CONC. H	1996	15" CORR. I PIPE	46	CRUM CREEK
	1276		23-86C INV. 48"C	23-85C INV. 48"C	1987	48" CMP ARCH. LA	52	CRUM CREEK
	1353		23-58C 4' SPEC.	23-59C 4' SPEC.	1992	18" RCP/PVT	41'	CRUM CREEK
	1480		23-26C 4' GRATE	23-27C 4' GRATE	1986	15" CMP/PVT	192'	CRUM CREEK
	1572		18-1C 2-4' SPEC	19-142C M.H.	1996	18" CORR. I PIPE	290'	CRUM CREEK
	1573		19-132C M.H.	19-133C M.H. Dun	1996	18" CORR. I PIPE	225'	CRUM CREEK
	1574		19-134C 4' SPEC.	Underground Storage S	1996	15" CORR. I PIPE	24'	CRUM CREEK
	1575		19-135C 4' SPEC.	Underground Storage S	1996	15" CORR. I PIPE	10'	CRUM CREEK
	1458		18-5 Type C	18-4 Type C	1996	30" ALMP Pvt	48	CRUM CREEK
	1275		23-85C TYPE C IN	23-86C INV. 45"C	1987	12" CMP/PVT	15'	CRUM CREEK
	1241		23-48C 6' GRATE	23-47C 6' GRATE	1972	24" RCP/PVT	216'	CRUM CREEK
	1217		23-19C TYPE C	23-20C CONC HD	1985	18" RCP/PVT	45'	CRUM CREEK
	1220		23-29C 6' GRATE	23-23C 6' GRATE	1984	18" RCP/PVT	45'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1222		23-23C 6' GRATE	23-22C 6' GRATE	1970	12" RCP/PVT	15'	CRUM CREEK
	1224		23-20C 4' GRATE	23-21C TYPE M	1970	12" RCP/PVT	265'	CRUM CREEK
	1225		23-39C TYPE M	23-31C TYPE M 4"	1994	36" CMP/PVT.	120'	CRUM CREEK
	1226		23-31C TYPE M	23-24C 6' GRATE	1970	PVC	35'	CRUM CREEK
	1259		23-78C M.H.	23-79C M.H.	1979	15" RCP/PVT	212'	CRUM CREEK
	1229		23-34C 4' SPEC	23-35C 4' GRATE	1991	15" CORR. I.P./PV	50'	CRUM CREEK
	1268		23-77C 4' GRATE	23-78C M.H.	1979	15" RCP PVT	20'	CRUM CREEK
	1242		23-48C 6' GRATE	23-49C 6' GRATE	1972	18" RCP PVT	215'	CRUM CREEK
	1240		23-49C 6' GRATE	23-47C 6' GRATE	1972	18" RCP PVT	200'	CRUM CREEK
	1244		23-47C 6' GRATE	23-46C 6' GRATE	1972	36" RCP PVT	216'	CRUM CREEK
	1251		23-56C 4' SPEC	23-57C 4' SPEC.	1972	18" RCP/PVT	84'	CRUM CREEK
	1252		23-57C 4' SPEC.	23-59C 4' SPEC	1972	18" RCP/PVT	18'	CRUM CREEK
	1578		19-138C 4' GRATE	19-139C 4' SPEC.	1984	72" Corr. I. P. Unde	140'	CRUM CREEK
	1226		23-23C CONC. TR	23-25C 6' GRATE	1991	15" CORR. I.P./PV	10'	CRUM CREEK
	1601		2LDG UD	19-164 M.H.	1980	12" RCP PVT.	120'	CRUM CREEK
	1545		19-105C 4x2' GRA	19-106C M.H.	1955	12" RCP PVT	113'	CRUM CREEK
	1546		19-106C M.H.	19-107C M.H.	1955	15" RCP PVT	264'	CRUM CREEK
	1543		19-107C M.H.	19-104C 4' PERF SP	1955	15" RCP PVT	250'	CRUM CREEK
	1555		19-115C 4' GRATE	19-117C 4' GRATE	1958	18" RC UD	196'	CRUM CREEK
	1598		19-160C M.H.	19-162C GRATE I	1963	12" RCP PVT	21'	CRUM CREEK
	1576		19-136C M.H.	19-111C 4' SPEC	1996	18" CORR. I. PIPE	23'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1600		24-3C M.H	19-160C M.H.	1980	12" RCP PVT	216'	CRUM CREEK
	1642		19-101C M.H	19-102C 12"x24" O	1955	14" TCP PVT.	88'	CRUM CREEK
	1602		BLDG. LD	19-166 M.H	1980	8" RCP PVT		CRUM CREEK
	1603		19-166C M.H.	19-165C M.H.	1980	8" RCP PVT	25'	CRUM CREEK
	1604		19-165 M.H.	19-161C M.H	1980	8" RCP PVT.	54'	CRUM CREEK
	1605		19-163C TYPE C	19-160C M.H.	1995	15" ACMP PVT.	18'	CRUM CREEK
	1606		19-168C TYPE C	72" ACMP	1996	15" ACMP PVT.	35	CRUM CREEK
	1857		23-1 Type C	18-5 Type C	1996	30" ACMP Pvt	43	CRUM CREEK
	1599		19-162C GRATE I	19-163C Junct Wit	1963	30" RCP PVT	126'	CRUM CREEK
	1596		19-158C M.H	19-161C Junct Wit	1980	15" RCP PVT	118'	CRUM CREEK
	1539		19-139C 4' SPEC	19-140C 4' GRATE	1984	12" CORR. SP PVT.	125'	CRUM CREEK
	1582		19-142C 5' SQ GR	JUNCT @ 24" RC	1963	18" RCP PVT	110'	CRUM CREEK
	1594		19-146C CO	19-145C 4' SQ GR	1963	12" RCP PVT.	260'	CRUM CREEK
	1567		19-149C 4' SQ GR	19-150C JUNCT @	1963	24" RCP PVT	75'	CRUM CREEK
	1592		19-156C GRATE I	19-157C M.H	1980	12" CIP PVT	100'	CRUM CREEK
	1593		BLDG LD	19-159 M.H	1980	10" CIP PVT.		CRUM CREEK
	1644		19-103C 12"x24" G	19-104C 4' PDH SP	1955	PVT	34'	CRUM CREEK
	1595		19-157C M.H	19-158C M.H.	1980	12" CIP PVT	47'	CRUM CREEK
	1641		19-102C 12"x24" G	19-103C 12"x24" G	1955	PVT.	208'	CRUM CREEK
	1597		24-3C M.H	19-160. M.H.	1980	12" RCP PVT.	214'	CRUM CREEK
	1518		19-92C 4'x2' GRAT	19-98C 4'x2' GRAT	1956	12" TCP PVT	733'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1519		19-99C 4'x2' GRAT	19-99C 4'x2' GRAT	1955	15" RCP PVT	200'	CRUM CREEK
	1543		19-99C 4'x2' GRAT	19-100C M.H.	1955	15" RCP PVT	95'	CRUM CREEK
	1541		19-100C M.H.	19-101C M.H.	1955	15" RCP PVT.	178'	CRUM CREEK
	1284		23-15C TYPE M	23-16C TYPE C	1985	18" RCP/PVT	42'	CRUM CREEK
	1504		19-159C M.H.	19-157C M.H.	1990	10" CIP PVT.	55'	CRUM CREEK
	296		7-32 C 4' TYPE M	7-34 C 4' TYPE M.	1990	24" or 30" RCP	225'	CRUM CREEK
	289		7-25 C 4' TYPE M	7-27 C 4' TYPE M.	1990	18" or 21" RCP	350'	CRUM CREEK
	290		7-28 C 4' TYPE M	7-27 C 4' TYPE M	1990	18" RCP	74'	CRUM CREEK
	291		7-27 C 4' TYPE M	7-29 C 4' TYPE M.	1990	21" or 27" RCP	150'	CRUM CREEK
	292		7-30 C 4' TYPE S.	7-31 C 4' TYPE M	1990	18" RCP	40	CRUM CREEK
	293		7-21 C 4' TYPE M	7-29 C 4' TYPE M.	1990	18" RCP	60	CRUM CREEK
	1216		23-17C TYPE C	23-18C TYPE C	1985	18" RCP/PVT	48'	CRUM CREEK
	295		7-33 C 4' TYPE S	7-32 C 4' TYPE M.	1990	18" RCP	60'	CRUM CREEK
	1013		27-15C 4' GRATE	27-13C 4' TYPE C	1990	15" RCP/PVT	20'	CRUM CREEK
	297		7-35 C 4' TYPE M	7-34 C 4' TYPE M.	1990	18" RCP	60'	CRUM CREEK
	298		7-36 C M.H.	7-37 C 4' TYPE M	1990	15" RCP	220'	CRUM CREEK
	299		7-37 C 4' TYPE M.	7-38 C M.H.	1990	24" RCP	260'	CRUM CREEK
	300		7-38 C M.H.	7-39 C CONC HD	1990	24" RCP	100'	CRUM CREEK
	301		7-40 C CONC HD	7-41 C M.H.	1990	36" RCP	275'	CRUM CREEK
	302		7-41 C M.H.	7-42 C CONC HD	1990	36" RCP	36'	CRUM CREEK
	294		7-29 C 4' TYPE M.	7-32 C 4' TYPE M.	1990	21" or 27" RCP	216'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1454		19-45C TRENCH D	CONN THROUGH	1966			CRUM CREEK
	1476		19-35C 4' GRATE	19-35C 4' GRATE	1966	12" RCP PVT		CRUM CREEK
	1477		19-39C 4' GRATE	19-38C 4' GRATE	1966	12" RCP PVT		CRUM CREEK
	1478		19-36C 4' GRATE	19-14C 4' GRATE	1966	12" RCP PVT		CRUM CREEK
	1479		19-43C 4' GRATE	19-42C 4' GRATE	1966	10" RCP PVT		CRUM CREEK
	1480		19-42C 4' GRATE	19-39C 4' GRATE	1966	12" RCP		CRUM CREEK
	1481		19-38C 4' GRATE	19-17C 4' GRATE	1966	12" RCP		CRUM CREEK
	288		7-26 C 4' TYPE M	7-25 C 4' TYPE M.	1990	18" RCP	60	CRUM CREEK
	1483		19-44C TRENCH D	12" RCP	1966	5" TRON		CRUM CREEK
	287		7-24 C 4' TYPE M.	7-25 C 4' TYPE M	1990	18" RCP	350'	CRUM CREEK
	1037		27-8L 4' SPEC.		1961	18" RC UD		CRUM CREEK
	1038		27-9C 4' GRATE	27-10C 4' GRATE	1965	12" CMP/PVT	192'	CRUM CREEK
	1039		27-10C 4' GRATE	27-11C 4' GRATE	1965	18" CMP/PVT	174'	CRUM CREEK
	1040		27-12C 4' GRATE	27-11C 4' GRATE	1965	12" CMP/PVT	216'	CRUM CREEK
	1041		27-13C 4' GRATE	27-13C 4' GRATE	1965	24" CMP/PVT	296	CRUM CREEK
	1099		24-4C 5'x5' GRATE	24-5C 5'x5' GRATE	1963	18" CMP/PVT	316'	CRUM CREEK
	1482		19-37C 4' GRATE	19-20C 4' GRATE	1966	12" RCP		CRUM CREEK
	1202		23-3C TYPE C	22 4C TYPE C	1995	24" ACMP/PVT	203'	CRUM CREEK
	322		60" HOLDING TA	8-182 C Modified S	1995	60 CMT	20'	CRUM CREEK
	1187		24-13C 4' SPEC	24-11 C 4' SPEC.	1985	21" SCP	45'	CRUM CREEK
	1192		24-109C 4' SPEC	24-110C 4' GRATE	1985	30" RCP	48	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1196		23-18C 6' GRATE	24-116C GRATE	1985	18" RCP/PVT	120'	CRUM CREEK
	1198		22-13C TYPE C	24-116C 6' GRATE	1985	18" RCP/PVT	120'	CRUM CREEK
	1199		15-8 C M.H.	23-20C TYPE C	1995	18" ACMP/PVT	245'	CRUM CREEK
	1075			26-1C TYPE C INL	1992	12" CIP (ROOF DR	420'	CRUM CREEK
	1201		23-20C TYPE C	23-30C TYPE C	1995	21" ACMP/PVT	30'	CRUM CREEK
	1202		22-25C 4' GRATE	22-29C CONC. BA	1986	24" CMP/PVT	27'	CRUM CREEK
	1205		23-6C M.H.	23-8C M.H.	1958	18" RCP	112'	CRUM CREEK
	1208		18-46C TYPE C	23-9C M.H.	1995	18" ACMP	12'	CRUM CREEK
	1211		23-11C TYPE C	23-12C TYPE C	1985	15" RCP/PVT	48'	CRUM CREEK
	1212		23-12C TYPE C	23-13C TYPE C	1985	15" RCP/PVT	65'	CRUM CREEK
	1213		22-13C TYPE C	23-14C TYPE C	1985	21" RCP/PVT	48'	CRUM CREEK
	1206		18-3C GRATE M.H.	24-8C M.H.	1995	18" HCMP/PVT	55'	CRUM CREEK
	1209		23-1C TYPE C	23-2C TYPE C	1995	15" ACMP/PVT	63'	CRUM CREEK
	1119		24-30C YARD DR	24-31C YARD DR	195'	10" TCP	90'	CRUM CREEK
	1215		23-16C TYPE C	23-17C TYPE C	1985	18" RCP/PVT	60'	CRUM CREEK
	1100		24-5C 5'x5' GRATE	24-6C JUNCT 8'x5'	1960	24" RCP/PVT		CRUM CREEK
	1101		24-8C 5'x5' GRATE	24-9C JUNCT 8'x5'	1980			CRUM CREEK
	1112		24-19C TYPE C IN	24-20C TYPE C IN	1987	36" CORR. I PERF.	215'	CRUM CREEK
	1114		24-21C M.H.	24-22C M.H.	1957	8" PVC PERF. PIPE	250'	CRUM CREEK
	1116		24-23C YARD DR	24-24C YARD DR	1951	8" TCP	80'	CRUM CREEK
	1151		24-56C 4' SPEC.	24-57C 6' SPEC	1980	36" RCP	78'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1118		24-29C YARD DR	24-30C YARD DR	1951	8" TCP	98'	CRUM CREEK
	1096		19-164C M H	24-3C M.H.	1980	12" RCP/PVT	100'	CRUM CREEK
	1120		24-31C YARD DR	24-32C YARD DR	1951	10" TCP	103'	CRUM CREEK
	1121		24-42C YARD DR	24-33C YARD DR	1951	12" TCP	109'	CRUM CREEK
	1122		24-33C YARD DR	24-24C 2X3' GRAT	1951	15" RCP	297'	CRUM CREEK
	1123		24-24C 2X3' GRAT	24-23C 8X4' CONC	1951	15" RCP	42'	CRUM CREEK
	1153		24-44C 4' PDH SPE	24-42C 6' GRATE	1957	27" RCP	50'	CRUM CREEK
	1301		22-27C 4' GRATE	22-26C 4' GRATE	1980	21" CMP/PVT	132'	CRUM CREEK
	1117		24-28C YARD DR	24-29C YARD DR	1951	8" TCP	83'	CRUM CREEK
	1870		18-12 6' Grate	18-15 MH Junct Bo	1972	30" RCP Pvt	96'	CRUM CREEK
	1863		18-10 6' Grate	18-11 6' Grate	1972	18" RCP Pvt	260'	CRUM CREEK
	1862		18-30 6' Grate	18-21 6' Grate	1972	15" RCP Pvt	186'	CRUM CREEK
	1881		BLDG	18-30 6' Grate	1972	15" RCP Pvt		CRUM CREEK
	1880		18-20 6' Grate	18-21 6' Grate	1972	18" RCP Pvt		CRUM CREEK
	1879		18-23 4' Grate & Tr	18-22 4' Grate	1972	18" RCP Pvt	152'	CRUM CREEK
	1876		18-26 4' Grate	18-23 4' Spec	1972	18" RCP Pvt	56'	CRUM CREEK
	1883		18-28 6' Grate	18-22 6' Grate	1972	18" RCP Pvt		CRUM CREEK
	1984		18-145 Precast Dut	18-146 Conc HDW	1997	18" RCP Pvt	75'	CRUM CREEK
	1865		23-83 MH	18-31 MH	1970	18" RCP Pvt	294'	CRUM CREEK
	1869		18-17 6' Grate	18-12 6' Grate	1972	18" RCP Pvt	170'	CRUM CREEK
	1868		18-14 MH	18-12 6' Grate	1972	RCP Pvt	230'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1857		18-16 MH	18-14 MH	1972	18" RCP Pvt	196'	CRUM CREEK
	1866		18-15 MH	18-24 MH	1972	18" RCP Pvt	298'	CRUM CREEK
	1863		18-12 6' Grate	18-11 6' Grate	1972	15" RCP Pvt	168'	CRUM CREEK
	1864		18-11 6' Grate	18-12 6' Grate	1972	15" RCP Pvt	340'	CRUM CREEK
	1871		18-29 4' Spec	18-27 6' Grate	1972	18" RCP Pvt	295'	CRUM CREEK
	1976		18-134 4' Type C	18-135 4' Type C	1995	18" CMP Pvt	95'	CRUM CREEK
	1980		18-144 French Drai	18-147 Double Type	1997	15" ADS Pvt	40'	CRUM CREEK
	1987		18-142 4' Type C	18-143 Conc HDW	1997	18" ADS Pvt	45'	CRUM CREEK
	1925		18-65 MH	18-70 Stone HDW	1961	48" RCP	24'	CRUM CREEK
	1951		18-140 4' Type C	18-141 4' Type C	1995	15" CMP Pvt	170'	CRUM CREEK
	1980		18-139 4' Type M	18-140 4' Type C	1995	15" CMP Pvt	88'	CRUM CREEK
	1979		18-138 4' Type C	18-139 4' Type M	1995	15" CMP Pvt	112'	CRUM CREEK
	1960		18-4 Type C	18-2 MH	1906	30" ACMP Pvt	75'	CRUM CREEK
	1977		18-135 4' Type C	18-136 4' Type C	1995	15" CMP Pvt	65'	CRUM CREEK
	1871		18-18 MH Junct. Bo	18-19 Ditch to Cree	1972	RCP Pvt		CRUM CREEK
	1972		18-133 4' Type C	18-134 4' Type C	1995	15" CMP Pvt	25'	CRUM CREEK
	1985		18-149 MH	18-147 Double Type	1997	3-48" ACP Det Sys.	80'	CRUM CREEK
	1974		18-132 4' Type C	18-133 4' Type C	1995	15" CMP Pvt	72'	CRUM CREEK
	1975		18-131 4' Type C	18-132 4' Type C	1995	15" CMP Pvt	62'	CRUM CREEK
	1898		18-46 MH	18-45 Stone HDW	1949	24" RCP	120'	CRUM CREEK
	1886		23-87 INV 48" CM	18-31 MH	1987	12" CMP Pvt	60'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
	1978		18-136 4' Type C	18-137 Conc HDW	1995	18" CMP Pvt	57'	CRUM CREEK
	1861		18-2 MH	18-3 MH	1996	72" ALMP Pvt	43'	CRUM CREEK
13-10C 4' TYPE M	1694	13-11C 4' TYPE M	12-73 4' TYPE M	12-70 4' TYPE M	1990	27" or 30" RCP	316'	CRUM CREEK
13-11C 4' TYPE M	1695	13-12C 4' TYPE M	12-70 4' TYPE M	13-69 4' TYPE M	1990	30" RCP	62'	CRUM CREEK
13-12C 4' TYPE M	1697	14-7C 4' TYPE M	13-69 4' TYPE M	12-66 4' TYPE M	1990	30" or 42" RCP	389'	CRUM CREEK
13-13C 4' TYPE S	1699	14-7C 4' TYPE M	12-65 4' TYPE S	12-66 4' TYPE M	1990	18" RCP	56'	CRUM CREEK
13-14C 4' TYPE S	1700	14-9C 4' TYPE M	12-62 4' TYPE S	12-63 4' TYPE M	1990	18" RCP	59'	CRUM CREEK
13-15C 4' TYPE S	1703	14-10C 4' TYPE M	12-59 4' TYPE S	12-58 4' TYPE M	1990	18" RCP	52'	CRUM CREEK
14-16C 4' TYPE M	1706	14-11C 4' TYPE M	12-55 4' TYPE M	12-58 4' TYPE M	1990	18" RCP	54'	CRUM CREEK
13-17C MH	1711	13-18C MH	12-90 MH	12-87 MH	1990	24" CIP	150'	CRUM CREEK
13-18C MH	1712	13-19C CONC HD	12-87 MH	12-86 CONC HDW	1990	36" CIP	58'	CRUM CREEK
13-1C 4' TYPE S	1682	13-2C 4' TYPE M	12-85 4' TYPE S	12-84 4' TYPE M	1990	18" RCP	56'	CRUM CREEK
13-20C 4' TYPE C	1679	13-22C 4' TYPE C	12-52 4' TYPE C	12-54 4' TYPE C	1989	18" ACP	67'	CRUM CREEK
13-21C 4' TYPE C	1677	13-22C 4' TYPE C	12-50 4' TYPE C	12-51 4' TYPE C	1989	18" ACP	32'	CRUM CREEK
13-22C 4' TYPE C	1676	13-23C 4' TYPE C	12-51 4' TYPE C	12-54 4' TYPE C	1986	18" ACP	34'	CRUM CREEK
13-23C 4' TYPE C	1680	13-24C CONC HD	12-54 4' TYPE C	12-55 CONC HDW	1986	24" ACP	55'	CRUM CREEK
13-25C MH	1714	13-26C CONC HD	12-79 MH	12-80 CONC HDW	1990	36" CIP	30'	CRUM CREEK
13-2C 4' TYPE M	1683	13-3C 4' TYPE S	12-84 4' TYPE M	12-83 4' TYPE S	1990	27" RCP	65'	CRUM CREEK
13-3C 4' TYPE S	1684	13-4C 4' TYPE S	12-83 4' TYPE S	12-82 4' TYPE S	1990	27" or 33" RCP	240'	CRUM CREEK
13-4C 4' TYPE S	1685	13-5C 4' TYPE M	12-82 4' TYPE S	12-81 4' TYPE M	1990	27" or 33" RCP	246'	CRUM CREEK
13-5C 4' TYPE M	1686	13-6C 4' TYPE M	12-81 4' TYPE M	12-76 4' TYPE M	1990	27" or 33" RCP	246'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
13-6C 4' TYPE S	1686	13-5C 4' TYPE M	12-59 4' TYPE S	12-70 4' TYPE M	1990	18" RCP	72'	CRUM CREEK
13-7C 4' TYPE M	1687	13-6BC 4' TYPE M	12-76 4' TYPE M	12-73 4' TYPE M	1990	27" or 36" RCP	190'	CRUM CREEK
13-8C 4' TYPE C	1690	13-9C 4' TYPE C	12-75 4' TYPE C	13-74 4' TYPE C	1990	18" RCP	62'	CRUM CREEK
13-9C 4' TYPE C	1691	13-10C 4' TYPE M	12-74 4' TYPE C	12-72 4' TYPE M	1990	18" CMP	46'	CRUM CREEK
14-10C 4' TYPE M	1705	14-13C 4' TYPE M	12-58 4' TYPE M	12-57 4' TYPE M	1990	18" CIP	53'	CRUM CREEK
14-11C 4' TYPE M	1707	14-12C 4' TYPE M	12-88 4' TYPE M	12-56 4' TYPE M	1990	18" RCP	54'	CRUM CREEK
14-12C 4' TYPE M	1708	14-13C 4' TYPE M	12-56 4' TYPE M	12-57 4' TYPE M	1990	18" RCP	210'	CRUM CREEK
14-13C 4' TYPE M	1709	14-14C CONC HD	12-57 4' TYPE M	12-60 CONC HDW	1990	36" CIP	60'	CRUM CREEK
14-13C BARREL R	1710	13-13C MH	12-60 BARREL RIS	12-59 MH	1990	24" CIP	200'	CRUM CREEK
14-14C 4' SPEC	1666	14-17C 4' SPEC	12-39 4' SPEC	12-38 4' SPEC	1977	22"x13" CMP	35'	CRUM CREEK
14-17C 4' SPEC	1667	14-19C 4' SPEC	12-38 4' SPEC	12-40 4' SPEC	1977	24" RCMP	214'	CRUM CREEK
14-18C 4' SPEC	1668	14-19C 4' SPEC	12-41 4' SPEC	12-40 4' SPEC	1977	22"x13" CMP	45'	CRUM CREEK
14-19C 4' SPEC	1669	14-20C 4' SPEC	12-40 4' SPEC	12-42 4' SPEC	1977	24" RCMP	217'	CRUM CREEK
14-1C 4' TYPE M	1715	13-25C MH	12-78 4' TYPE M	12-79 MH	1990	36" RCP	210'	CRUM CREEK
14-20C 4' SPEC	1670	14-21C 4' SPEC	12-42 4' SPEC	12-43 4' SPEC	1977	24" RCMP	96'	CRUM CREEK
14-21C 4' SPEC	1671	14-22C 4' SPEC	12-43 4' SPEC	12-44 4' SPEC	1977	18"x29" CMP	90'	CRUM CREEK
14-21C 4' SPEC	1672	14-23C 4' SPEC	12-43 4' SPEC	12-45 4' SPEC	1977	21" RCMP	91'	CRUM CREEK
14-23C 4' SPEC	1673	14-24C 4' SPEC	12-45 4' SPEC	12-46 4' SPEC	1977	21" RCMP	100'	CRUM CREEK
14-24C 4' SPEC	1674	14-25C 4' SPEC	12-46 4' SPEC	12-47 4' SPEC	1977	21" RCMP	144'	CRUM CREEK
14-25C 4' SPEC	1675	14-27C 4' SPEC	12-47 4' SPEC	12-49 4' SPEC	1977	29"x18" CMP	64'	CRUM CREEK
14-26C 4' SPEC	1676	14-27C 4' SPEC	12-48 4' SPEC	12-49 4' SPEC	1977	18" RCMP	92'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
14-28C 4' SPEC	1656	14-29C 4' SPEC	12-26 4' SPEC	12-27 4' SPEC	1964	15" RCP	44'	CRUM CREEK
14-29C 4' SPEC	1657	14-30C 4' SPEC	12-27 4' SPEC	12-28 4' SPEC	1964	18" RCP	145'	CRUM CREEK
14-2C 4' TYPE S	1687	13-6C 4' TYPE S	12-77 4' TYPE S	12-89 4' TYPE S	1990	18" RCP	74'	CRUM CREEK
14-30C 4' SPEC	1658	14-31C STONE HD	12-28 4' SPEC	12-29 STONE HD	1964	18" RCP	175'	CRUM CREEK
14-32C 4' SPEC	1659	14-33C 6' SPEC	12-30 4' SPEC	12-31 6' SPEC	1964	18" RCP	36'	CRUM CREEK
14-33C 6' SPEC	1660	14-34C MH	12-31 6' SPEC	12-32 MH	1964	21" RCP	59'	CRUM CREEK
14-34C MH	1661	14-35C STONE HD	12-32 MH	12-33 STONE HD	1964	21" RCP	92'	CRUM CREEK
14-36C 6' SPEC	1662	14-37C 6' SPEC	12-21 6' SPEC	12-22 6' SPEC	1964	15" RCP	190'	CRUM CREEK
14-37C 6' SPEC	1663	14-38C STONE HD	12-22 6' SPEC	12-23 STONE HD	1964	18" RCP	190'	CRUM CREEK
14-39C End Conc E	1654	14-40C End Conc E	12-25 End Conc Ero	12-24 End Conc Ero	1965	2'-6" Conc Ditch Gut	264'	CRUM CREEK
14-3C CONC HDW	1692	14-4C 4' TYPE M	12-71 CONC HDW	12-72 4' TYPE M	1990	18" CIP	75'	CRUM CREEK
14-41C 6' SPEC	1628	14-42C 4' SPEC	12-1 6' SPEC	12-2 4' SPEC	1957	30" RCP	58'	CRUM CREEK
14-42C 4' SPEC	1629	14-43C Stone HDW	12-2 4' SPEC	12-3 Stone HDW	1958	30" RCP	188'	CRUM CREEK
14-44C 4' SPEC	1662	14-45C 4' SPEC	12-34 4' SPEC	12-35 4' SPEC	1964	15" RCP	46'	CRUM CREEK
14-45C 4' SPEC	1663	14-46C MH	12-35 4' SPEC	12-36 MH	1964	18" RCP	84'	CRUM CREEK
14-46C MH	1664	14-47C STONE HD	12-36 MH	12-37 STONE HD	1964	18" RCP	130'	CRUM CREEK
14-48C 6' SPEC	1639	14-49C 6' SPEC	12-4 6' SPEC	12-5 6' SPEC	1956	15" RCP	36'	CRUM CREEK
14-49C 6' SPEC	1640	14-50C 4' GRATE	12-5 6' SPEC	12-6 4' GRATE	1956	21" RCP	140'	CRUM CREEK
14-4C 4' TYPE M	1691	13-10C 4' TYPE M	12-72 4' TYPE M	12-73 4' TYPE M	1990	18" RCP	146'	CRUM CREEK
14-50C 4' GRATE	1641	14-51C 4' SPEC	12-6 4' GRATE	12-7 4' SPEC	1956	21" RCP	135'	CRUM CREEK
14-51C 4' SPEC	1642	14-52C 6' SPEC	12-7 4' SPEC	12-8 6' SPEC	1956	24" RCP	98'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
14-53C 6' SPEC	1643	14-53C 6' SPEC	12-8 6' SPEC	12-9 6' SPEC	1956	30" RCP	32'	CRUM CREEK
14-53C 6' SPEC	1644	14-54C STONE HD	12-9 6' SPEC	13-10 STONE HD	1956	30" RCP	343'	CRUM CREEK
14-55C 4' SPEC	1650	14-56C 6' SPEC	12-18 6' SPEC	12-19 6' SPEC	1956	15" RCP	36'	CRUM CREEK
14-56C 6' SPEC	1651	14-57C 6 STONE HD	12-19 6' SPEC	12-20 6 STONE HD	1956	24" RCP	210'	CRUM CREEK
14-58C 6' SPEC	1648	14-59C 4' SPEC	12-15 6' SPEC	12-16 4' SPEC	1956	18" RCP	36'	CRUM CREEK
14-59C 4' SPEC	1649	14-60C STONE HD	12-16 4' SPEC	12-17 STONE HD	1956	21" RCP	142'	CRUM CREEK
14-9C 4' TYPE M	1695	13-12C 4' TYPE M	12-68 4' TYPE M	12-69 4' TYPE M	1990	18" RCP	72'	CRUM CREEK
14-61C 6' SPEC	1645	14-62C 4' SPEC	12-11 6' SPEC	12-12 4' SPEC	1956	18" RCP	50'	CRUM CREEK
14-62C 4' SPEC	1646	14-63C 4' SPEC	12-12 4' SPEC	12-13 4' SPEC	1956	18" RCP	250'	CRUM CREEK
14-63C 4' SPEC	1647	14-64C STONE HD	12-13 4' SPEC	13-14 STONE HD	1956	21" RCP	150'	CRUM CREEK
14-65C 4' SPEC	1775	14-66C 4' SPEC	13-72 4' SPEC	13-73 4' SPEC	1957	18" RCP	74'	CRUM CREEK
14-66C 4' SPEC	1776	14-67C STONE HD	13-73 4' SPEC	13-74 STONE HD	1957	21" RCP	255	CRUM CREEK
14-68C 4' SPEC	1781	14-69C 4' SPEC	13-80 4' SPEC	13-81 4' SPEC	1957	18" RCP	32'	CRUM CREEK
14-69C 4' SPEC	1782	14-70C STONE HD	13-81 4' SPEC	13-82 STONE HD	1958	21" RCP	187'	CRUM CREEK
14-6C 4' TYPE S	1699	14-7C 4' TYPE M	12-67 4' TYPE S	12-66 4' TYPE M	1990	18" RCP	54'	CRUM CREEK
14-71C	1800	14-41C 6' SPEC	13-85	12-1 6' SPEC.				CRUM CREEK
14-72C 4' SPEC	1777	14-73C 4' SPEC	13-75 4' SPEC	13-76 4' SPEC	1957	15" RCP	42'	CRUM CREEK
14-73C 4' SPEC	1778	14-74C 4' SPEC	13-76 4' SPEC	13-77 4' SPEC	1957	18" RCP	262'	CRUM CREEK
14-74C 4' SPEC	1779	14-75C 4' SPEC	13-77 4' SPEC	13-78 4' SPEC	1957	21" RCP	18'	CRUM CREEK
14-75C 4' SPEC	1780	14-76C 4' GRATE	13-78 4' SPEC	13-79 4' GRATE	1957	24" RCP	133'	CRUM CREEK
14-76C 4' GRATE	1627	14-41C 6' SPEC.	13-79 4' GRATE	12-1 6' SPEC.	1957	24" RCP	132'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
14-77C 6' GRATE	1729	14-78C 6' SPEC	13-19 6' GRATE	13-20 6' SPEC	1956	18" RCP	30'	CRUM CREEK
14-78C 6' SPEC	1730	14-69C STONE HD	13-20 6' SPEC	13-21 STONE HD	1956	24" RCP	125'	CRUM CREEK
14-79C 4' TYPE M	1700	14-80C 4' TYPE M	12-66 4' TYPE M	12-63 4' TYPE M	1990	42" CIP	230'	CRUM CREEK
14-80C 4' GRATE	1716	14-82C 4' GRATE	13-7 4' GRATE	13-6 4' GRATE	1955	18" RCP	62'	CRUM CREEK
14-81C CONC HD	1715	14-82C 4' GRATE	13-8 CONC HDW	13-6 4' GRATE	1955	18" RCP	112'	CRUM CREEK
14-82C 4' GRATE	1717	15-12C 4' GRATE	13-8 4' GRATE	13-9 4' GRATE		15" CMP	356'	CRUM CREEK
14-83C TRENCH D	1726	14-84C 4' GRATE	13-16 TRENCH DR	13-17 4' GRATE	1962	4' CIP	39'	CRUM CREEK
14-84C 4' GRATE	1727	15-36C 4' GRATE	13-17 4' GRATE	13-18 4' GRATE	1962	12" RCP	228'	CRUM CREEK
14-85C 4' TYPE S	1702	14-9C 4' TYPE M	12-64 4' TYPE S	12-62 4' TYPE M	1990	12" RCP	56'	CRUM CREEK
14-9C 4' TYPE M	1703	14-10C 4' TYPE M	12-63 4' TYPE M	12-55 4' TYPE M	1990	48" CIP	196'	CRUM CREEK
15-100C HDW	1849	15-102C #1 OM	14-158 HDW	14-154 #1 OM		RCP	187'	CRUM CREEK
15-101C #1 OM	1850	15-102C #1 OM	14-155 #1 OM	14-156 #1 OM			35'	CRUM CREEK
15-102C #1 OM	1851	15-103C #1 OM	14-156 #1 OM	14-154 #1 OM			42'	CRUM CREEK
15-103C #1 OM	1852	15-104C #1 OM	14-156 #1 OM	14-153 #1 OM			34'	CRUM CREEK
15-104C #1 OM	1853	15-108C MH	14-153 #1 OM	14-157 MH			34'	CRUM CREEK
15-105C #2 OM &	1845	15-106C #1 OM &	14-140 #2 OM & Gr	14-151 #1 OM & Gr		18" RCP	150'	CRUM CREEK
15-106C #1 OM &	1844	15-107C #1 OM	14-151 #1 OM & Gr	14-152 #1 OM		42" RCP	46'	CRUM CREEK
15-107C #1 OM	1845	15-108C MH	14-152 #1 OM	14-157 MH	1955	42" RCP	45'	CRUM CREEK
15-108C MH	1854	15-109C Stone HD	14-157 MH	13-160 Stone HDW	1955	42" RCP	113'	CRUM CREEK
15-10C 6' SPEC	1771	15-11C JUNCT HD	13-67 6' SPEC	13-68 JUNCT HDW	1956	24" RCP	144'	CRUM CREEK
15-110C 2 #1 OM	1855	15-111C Conc HD	14-162 2 #1 OM	14-161 Conc HDW		24" RCP	113'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
15-112C 4' Type C	1959	15-113C MH	18-116 4' Type C	18-117 MH	1999	18" RCP	12'	CRUM CREEK
15-113C MH	1960	15-4C MH	18-117 MH	18-119 MH		18" RCP	387'	CRUM CREEK
15-1C JUNCT BO	462	15-1C JUNCT BO	18-68 JUNCT BO	8-13 JUNCT BOX	1965	24" RCP	158'	CRUM CREEK
15-120C CHANNEL	1723	15-120C 8.5X5' CON	13-69A CHANNEL	13-70 8.5x5' CONC	1967	4'x5' Stone Masonry	130'	CRUM CREEK
15-130C HDW CON	1731	15-130C HDW CON	13-76 HDW CONC	13-77 HDW CONC	1926	8'x5' Conc Box Culv	315'	CRUM CREEK
15-135C 81 OM & G	1783	15-166C 4' STD INL	13-85 #1 OM & GR	13-84 4' STD INLE	1935	12" RCP	8'	CRUM CREEK
15-160C 4' STD INL	1784	15-180C 4' STD INL	13-84 4' STD INLE	13-87 4' STD INLE	1935	36" RCP	96'	CRUM CREEK
15-170C #1 OM & G	1785	15-180C 4' STD INL	13-86 #1 OM & GR	13-87 4' STD INLE	1935	12" RCP	5'	CRUM CREEK
15-190C 4' STD INL	1786	15-198C DROP JUN	13-87 4' STD INLE	14-68 DROP JUNC	1973	66" RCP	52'	CRUM CREEK
15-1C JUNCT BO	461	15-2C STONE HD	8-13 C JUNCT BO	8-14 C STONE HD	1962	60" RCP	128'	CRUM CREEK
15-200C 4' SPEC	1767	15-210C 4' SPEC	13-63 4' SPEC	13-60 4' SPEC	1955	15" RCP	33'	CRUM CREEK
15-210C 4' SPEC	1768	15-220C STONE HD	13-64 4' SPEC	13-65 STONE HD	1955	15" RCP	130'	CRUM CREEK
15-230C 6' SPEC	1765	15-240C 6' SPEC	13-60 6' SPEC	13-61 6' SPEC	1955	15" RCP	38'	CRUM CREEK
15-240C 6' SPEC	1766	15-250C STONE HD	13-61 6' SPEC	13-63 STONE HD	1955	21" RCP	240'	CRUM CREEK
15-260C 4' SPEC	1750	15-270C 4' SPEC	13-40 4' SPEC	13-41 4' SPEC	1955	15" RCP	35'	CRUM CREEK
15-270C 4' SPEC	1751	15-280C STONE HD	13-41 4' SPEC	13-42 STONE HD	1955	18" RCP	128'	CRUM CREEK
15-290C 4' SPEC	1752	15-300C 4' SPEC	13-43 4' SPEC	13-44 4' SPEC	1955	15" RCP	65'	CRUM CREEK
15-300C 4' SPEC	1753	15-310C STONE HD	13-44 4' SPEC	13-45 STONE HD	1955	18" RCP	132'	CRUM CREEK
15-320C 4' GRATE	1718	15-330C 4' GRATE	13-9 4' GRATE	13-5 4' GRATE	1950	27" RCP	55'	CRUM CREEK
15-330C 4' GRATE	1719	15-340C 4' GRATE	13-5 4' GRATE	13-12 4' GRATE	1950	27" RCP	232'	CRUM CREEK
15-350C 2' GRATE	1720	15-360C 6' GRATE	13-12 4' GRATE	13-2 6' GRATE	1950	27" RCP	70'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
15-36C STONE HD	1721	15-37C 6' GRATE	13-1 STONE HDW	13-2 6' GRATE	1958	24" RCP	13'	CRUM CREEK
15-36C 4' GRATE	1726	15-37C 6' GRATE	13-18 4' GRATE	13-2 6' GRATE	1962	12" RCP	128'	CRUM CREEK
15-37C 6' GRATE	1722	15-38C BEHIND 40'	13-2 6' GRATE	13-3 6' GRATE	1950	24" RCP	38'	CRUM CREEK
15-37C 6' GRATE	2000	15-38C END 36" R	13-3 6' GRATE	END 36" RCP		36" RCP		CRUM CREEK
15-38CONC HDW	351	15-4C CONC HDW	8-104 CONC HDW	8-105 6' CONC HD	1926	11.5X4' CONC BO	25'	CRUM CREEK
15-40C	2001	15-41C						CRUM CREEK
15-42C 4' GRATE	1723	15-43C 4' GRATE	13-10 4' GRATE	13-11 4' GRATE		15" RCP	45'	CRUM CREEK
15-44C 4' SPEC	1754	15-45C 4' SPEC	13-46 4' SPEC	13-47 4' SPEC	1955	15" RCP	58'	CRUM CREEK
15-45C 4' SPEC	1755	15-46C 6' SPEC	13-47 4' SPEC	13-48 6' SPEC	1955	18" RCP	56'	CRUM CREEK
15-46C 6' SPEC	1756	15-47C 6' SPEC	13-48 6' SPEC	13-49 6' SPEC	1955	21" RCP	56'	CRUM CREEK
15-47C 6' SPEC	1757	15-48 4' GRATE	13-49 6' SPEC	13-50 4' GRATE	1955	24" RCP	154'	CRUM CREEK
15-48 4' GRATE	1758	15-49C 4' GRATE	13-50 4' GRATE	13-51 4' GRATE	1956	24" RCP	72'	CRUM CREEK
15-49C 4' GRATE	1759	15-50C STONE HD	13-51 4' GRATE	13-52 STONE HD	1956	24" RCP	63'	CRUM CREEK
15-51C CONC HD	1728	15-53C 6' GRATE	13-26 CONC HDW	13-13 6' GRATE		30" RCP	128'	CRUM CREEK
15-52C STONE HD	1724	15-53C 6' GRATE	13-14 STONE HD	13-13 6' GRATE	1958	15" RCP	51'	CRUM CREEK
15-53C 6' GRATE	1725	15-55C MH	13-13 6' GRATE	13-15 MH	1958	30" RCP	60'	CRUM CREEK
15-54C 4' GRATE	1749	JUNCT 30" RCP	13-29 4' GRATE	JUNCT 30" RCP	1955	18" RCP	8'	CRUM CREEK
15-55C MH	1731	15-56C #1 OM	13-15 MH	13-29 #1 OM	1955	30" RCP	133'	CRUM CREEK
15-56C #1 OM	1732	15-57C #1 OM	13-19 #1 OM	13-20 #1 OM	1955	30" RCP	40'	CRUM CREEK
15-57C #1 OM	1733	15-58C 4' GRATE	13-20 #1 OM	13-21 4' GRATE	1955	30" RCP	115'	CRUM CREEK
15-59C 4' GRATE	1734	15-59C #1 OM	13-21 4' GRATE	13-23 #1 OM	1955	30" RCP	122'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
15-59C #1 OM	1735	15-60C #1 OM	13-23 #1 OM	13-22 #1 OM	1955	30" RCP	5'	CRUM CREEK
15-5C #30 M & GR	386	15-6C #30M & GR	A-92 C #30 M & G	B-98 C #30M & GR		12" RCP		CRUM CREEK
15-60C #1 OM	1736	15-61 2-#1 OM	13-22 #1 OM	13-24 2 #1 OM	1955	36" RCP	36'	CRUM CREEK
15-61 2-#1 OM	1737	15-62C STONE HD	13-24 2-#1 OM	13-25 STONE HD	1955	36" RCP	150'	CRUM CREEK
15-63C 4' SPEC	1760	15-64C 4' SPEC	13-53 4' SPEC	13-54 4' SPEC	1955	15" RCP	26'	CRUM CREEK
15-64C 4' SPEC	1761	15-65C STONE HD	13-54 4' SPEC	13-55 STONE HD	1955	18" RCP	133'	CRUM CREEK
15-66C CONC HD	1729	15-68C MH	13-27 CONC HDW	13-28 MH	1950	18" RCP	90'	CRUM CREEK
15-67C 4' GRATE	1748	JUNCT 18" RCP	13-38 4' GRATE	JUNCT 18" RCP		18" RCP	6'	CRUM CREEK
15-68C MH	1740	15-69C #1 OM	13-28 MH	13-29 #1 OM	1955	18" RCP	120'	CRUM CREEK
15-69C #1 OM	1741	15-70C #1 OM	13-29 #1 OM	13-30 #1 OM	1955	21" RCP	36'	CRUM CREEK
15-6C #30M & GR	387	15-7C GRATE	B-98 C #30 M & G	B-99 C GRATE		12" RCP		CRUM CREEK
15-70C #1 OM	1742	15-71C STONE HD	13-30 #1 OM	13-31 STONE HD	1955	24" RCP	110'	CRUM CREEK
15-72C CONC HD	1743	15-73C MH	13-32 CONC HDW	13-33 MH	1950	24" RCP	62'	CRUM CREEK
15-73C MH	1744	15-74C #1 OM & G	13-33 MH	13-34 #1 OM & GR	1955	24" RCP	149'	CRUM CREEK
15-74C #1 OM & G	1745	15-75C 4' GRATE I	13-34 #1 OM & GR	13-35 4' GRATE IN	1955	24" RCP	24'	CRUM CREEK
15-75C 4' GRATE I	1746	15-76C 2-#1 OM	13-35 4' GRATE IN	13-36 2-#1 OM	1955	24" RCP	35'	CRUM CREEK
15-76C 2-#1 OM	1747	15-77C STONE HD	13-36 2-#1 OM	13-37 STONE HD	1955	27" RCP	114'	CRUM CREEK
15-78C STONE HD	1762	15-81C STONE HD	13-46 STONE HD	13-47 STONE HD	1955	60" RCP	100'	CRUM CREEK
15-79C 6' SPEC	1763	CONN TO 60" RCP	13-48 6' SPEC	CONN TO 60" RCP	1955			CRUM CREEK
15-80C 6' SPEC	1764	CONN TO 60" RCP	13-49 6' SPEC	CONN TO 60" RCP	1955	78" RCP	22'	CRUM CREEK
15-82C HDW CON	1787	15-83C END CON	13-89 HDW CONC	13-90 END CONC	1926	4x4' Conc Box Cul	42'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
15-83C END CON	1788	15-84C End Stone	13-90 END CONC	13-9 End Stone &	1972	4'x3' Stone Masonry	150'	CRUM CREEK
15-85C Clean Out	1789	15-94C Clean Out	13-92 Clean Out	14-101 Clean Out	1961	8" to 12" CI Rain W	382'	CRUM CREEK
15-86C 24"x36" CB	1790	Conn to Main Front	13-93 24"x36" CB	Conn to Main Front	1961	8" CIP PVT	40'	CRUM CREEK
15-87C END ROOF	1791	Conn to Main Front	13-96 END ROOF	Conn to Main Front	1961	8" to 30" CIP PVT	130'	CRUM CREEK
15-88C 24"x36" CB	1792	Conn to Back Drain	13-95 24"x36" CB	Conn to Back Drain	1961	4" CIP PVT	12'	CRUM CREEK
15-89C 24"x36" CB	1793	Conn to Main Front	13-94 24"x36" CB	Conn to Main Front	1961	8" CIP PVT	40'	CRUM CREEK
15-80C 6' SPEC	1769	15-108C 6' SPEC	13-69 6' SPEC	13-62 6' SPEC	1955	21" RCP	88'	CRUM CREEK
15-90C Conn to Bld	1799	15-96C CONC HD	13-103 Conn to Bld	13-109 CONC HD	1961	4" to 15" CIP PVT	110'	CRUM CREEK
15-91C Clean Out	1795	Conn to 10" Main D	13-99 Clean Out	Conn to 10" Main D	1961	8" to 10" CIP PVT	150'	CRUM CREEK
15-92C 4' CB	1796	Conn to 8" Main Dr	13-102 4' CB	Conn to 8" Main Dr	1961	4" CIP PVT	16'	CRUM CREEK
15-93C Clean Out	1794	Conn to 15" Main D	13-101 Clean Out	Conn to 15" Main D	1961	12" CIP PVT	40'	CRUM CREEK
15-94C 12"x16" 20'	1797	Conn to 15" Main D	13-97 12"x16" 20' L	Conn to 15" Main D	1961	6" CIP PVT	56'	CRUM CREEK
15-95C 24"x36" CB	1798	Conn to 15" Main D	13-98 24"x36" CB	Conn to 15" Main D	1961	4" CIP PVT	12'	CRUM CREEK
15-97C End Culvert	1946	15-99C Grate Inlet	14-150 End Culvert	14-150 Grate Inlet				CRUM CREEK
15-98C Conc HDW	1947	Box Culvert	14-149 Conc HDW	Box Culvert			16'	CRUM CREEK
15-99C Grate Inlet	1848	15-104C MH	14-150 Grate Inlet	14-151 MH			330'	CRUM CREEK
15-9C 6' SPEC	1770	15-10C 6' SPEC	13-66 6' SPEC	13-63 6' SPEC	1955	36" RCP	42'	CRUM CREEK
16-108C #2 OM &	1832	16-109C #2 OM &	14-135 #2 OM & Gr	14-136 #2 OM & Gr				CRUM CREEK
16-109C #2 OM &	1811	16-110C #2 OM &	14-136 #2 OM & Gr	14-137 #2 OM & Gr				CRUM CREEK
16-110C #2 OM &	1934	16-112C #2 OM &	14-137 #2 OM & Gr	14-138 #2 OM & Gr				CRUM CREEK
16-111C #2 OM &	1935	16-112C #2 OM &	14-139 #2 OM & Gr	14-138 #2 OM & Gr				CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
16-128C #2 OM &	1836	15-105C #2 OM &	14-138 #2 OM & Gr	14-140 #2 OM & Gr				CRUM CREEK
16-113C 4' Spec	1826	16-114C 4' Spec	14-125 4' Spec	14-129 4' Spec	1977	15" RCP	32'	CRUM CREEK
16-114C 4' Spec	1827	16-115C 4' Spec	14-129 4' Spec	14-130 4' Spec	1977	15" RCP	76'	CRUM CREEK
16-115C 4' Spec	1828	16-116C 4' Spec	14-130 4' Spec	14-131 4' Spec	1969	18" RCP	55'	CRUM CREEK
16-116C 4' Spec	1829	16-118C #2 OM &	14-131 4' Spec	14-132 #2 OM & Gr	1969	18" RCP	135'	CRUM CREEK
16-117C #2 OM &	1830	16-118C #2 OM &	14-133 #2 OM & Gr	14-132 #2 OM & Gr		18" TCP	22'	CRUM CREEK
16-118C #2 OM &	1831	16-119C End 18" T	14-132 #2 OM & Gr	14-134 End 18" TC		18" TCP	52'	CRUM CREEK
16-120C 4' Spec	1814	16-121C 4' Spec	14-128 4' Spec	14-129 4' Spec	1955	15" RCP	28'	CRUM CREEK
16-121C 4' Spec	1815	16-122C 4' Spec	14-129 4' Spec	14-106 4' Spec	1955	18" RCP		CRUM CREEK
16-122C 4' Spec	1801	16-123C 4' Spec	14-106 4' Spec	14-107 4' Spec	1955	18" RCP	26'	CRUM CREEK
16-123C 4' Spec	1802	16-124C 6' Grate	14-107 4' Spec	14-108 6' Grate	1964	24" RCP	82'	CRUM CREEK
16-124C 6' Grate	1803	16-125C 6' Grate	14-108 6' Grate	14-109 6' Grate	1964	24" RCP	60'	CRUM CREEK
16-125C 6' Grate	1804	16-126C 6' Grate	14-109 6' Spec	14-110 6' Grate		24" RCP	316'	CRUM CREEK
16-126C 6' Grate	1805	16-127C 6' Grate	14-110 6' Grate	14-111 6' Grate		36" RCP	34'	CRUM CREEK
16-127C 6' Grate	1806	16-128C MH	14-111 6' Grate	14-112 MH	1957	36" RCP	24'	CRUM CREEK
16-128C MH	1807	16-129C Stone HD	14-112 MH	14-113 Stone HDW	1957	36" RCP	180'	CRUM CREEK
16-129C Stone HD	1808	16-131C Stone HD	14-113 Stone HDW	14-114 Stone HDW	1961	3'x3' Stone Channel	175'	CRUM CREEK
16-130C OM & GR	1816	Connect to Channel	14-130 #1 OM	Connect to Channel	1967	18" RCP	15'	CRUM CREEK
16-131C Stone HD	1809	16-132C 4' Grate	14-114 Stone HDW	14-115 4' Grate	1957	45"x29" LO-HEAD R	100'	CRUM CREEK
16-132C 4' Grate	1810	16-143C 4' Grate	14-115 4' Grate	14-116 4' Grate	1959	36" RCP	120'	CRUM CREEK
16-133C 4' Spec	1817	16-134C 4' Spec	14-119 4' Spec	14-120 4' Spec	1953	18" RCP	26'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
16-134C 4' Spec	1818	16-135C HDW at C	14-120 4' Spec	14-121 HDW at Cr	1955	18" RCP	130	CRUM CREEK
16-135C HDW at C	1819	16-136C HDW	14-121 HDW	14-122 HDW	1967	Stone Channel 3' Wi	218'	CRUM CREEK
16-136C HDW	1820	16-137C 4' Spec	14-122 HDW	14-123 4' Spec	1955	24" RCP	165'	CRUM CREEK
16-137C 4' Spec	1821	16-138C 4' Spec	14-123 4' Spec	14-124 4' Spec		36" RCP	34'	CRUM CREEK
16-138C 4' Spec	1822	16-141C 4' Grate	14-124 4' Spec	14-125 4' Grate	1977	36" RCP	155'	CRUM CREEK
16-139C 4' Spec	1823	16-140C 4' Spec	14-126 4' Spec	14-127 4' Spec	1977	15" RCP	12'	CRUM CREEK
16-140C 4' Spec	1824	16-141C 4' Grate	14-127 4' Spec	14-128 4' Grate	1977	18" RCP	115'	CRUM CREEK
16-141C 4' Grate	1825	16-142C 4' Grate	14-128 4' Grate	14-118 4' Grate	1977	36"RCP	170'	CRUM CREEK
16-142C 4' Grate	1833	16-143C 4' Grate	14-118 4' Grate	14-116 4' Grate	1959	36" RCP	70'	CRUM CREEK
16-143C 4' Grate	1831	16-144C 4' Spec	14-116 4' Grate	14-117 4' Spec	1959	48" RCP	134'	CRUM CREEK
16-144C 4' Spec	1832	16-145C 4' Spec	14-117 4' Spec	14-102 4' Spec	1959	48" RCP	34'	CRUM CREEK
16-145C 6' SPEC.	1522	16-134C 4' GRATE	14-105C 6' SPEC	19-81C 4' GRATE	1959	48" RCP	282'	CRUM CREEK
16-146C End 12" V	1837	16-147C #2 OM Inl	14-144 End 12" VC	14-142 #2 OM Inlet		12" VCP	85'	CRUM CREEK
16-147C #2 OM Inl	1838	16-148C #2 OM Inl	14-142 #2 OM Inlet	14-143 #2 OM Inlet		12" VCP	22'	CRUM CREEK
16-148C #2 OM Inl	1839	16-149C End 12" V	14-143 #2 OM Inlet	14-144 End 12" VC		12" VCP	84'	CRUM CREEK
16-150C End 12" V	1840	16-151C #2 OM	14-145 End 12" VC	14-146 #2 OM		12" VCP	136'	CRUM CREEK
16-151C #2 OM	1841	16-152C #2 OM Inl	14-146 #2 OM Inlet	14-147 #2 OM Inlet		12" VCP	44'	CRUM CREEK
16-153C #2 OM Inl	1842	16-154C Conc HD	14-147 #2 OM Inlet	14-148 Conc HDW		12" VCP	17'	CRUM CREEK
16-154C 4' GRATE	1523	22-26C 4' GRATE 1	19-81C 4' GRATE	19-82C 4' GRATE J	1959	48" RCP	136'	CRUM CREEK
17-32C 2-#1 OM	1986	17-33C 2-#1 OM	15-85 2-#1 OM	15-86 2-#1 OM	1953	18" RCP	28'	CRUM CREEK
17-33C 2-#1 OM	1443	23-5C STONE HD	15-86 2-#1 OM	23-10BC STONE H	1953	24" RCP	184'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
17-54C #1 OM	1987	17-55C #1 OM	15-87 #1 OM	15-88 #1 OM		24" RCP	77	CRUM CREEK
17-55C #1 OM	1988	17-56C End 24" RC	15-88 #1 OM	15-59 End 24" RCP	1958	24" RCP	192'	CRUM CREEK
17-56C Field chk fo	1345	23-18C INV. IRON	15-89C	20-7C INV. IRON P		24" IRON PIPE AR	+-60'	CRUM CREEK
17-57C 2-6' GRAT	1437	23-42C M.H.	15-90C 2-6'x4-RAT	20-41C M.H.	1954	15" RCP	217'	CRUM CREEK
18-7 2 Type C	1856	18-8 MH	18-7 2 Type C	18-8 MH	1996	15" ADMP PVC	140	CRUM CREEK
20-10C 6' GRATE	1249	20-11C 6' GRATE	23-53C 6' GRATE	23-55C 6' GRATE	1972	48" RCP/PVT	34'	CRUM CREEK
20-11C 6' GRATE	1250	20-12C 4' SPEC.	23-55C 6' GRATE	23-56C 4' SPEC.	1972	48" RCP/PVT	180'	CRUM CREEK
20-12C 4' SPEC.	1254	20-13C M.H.	23-56C 4' SPEC.	23-60C M.H.	1972	48" RCP/PVT	162'	CRUM CREEK
20-13C M.H.	1255	20-14C 6' GRATE	23-60C M.H.	23-51C 6' GRATE	1972	48" RCP/PVT	283'	CRUM CREEK
20-14C 6' GRATE	1862	20-15C MH	23-61 6' Grate	18-9 MH	1972	48" RCP PVC	212'	CRUM CREEK
20-1C 4' SPEC	1293	20-2C 4' SPEC.	17-1C 4' SPEC	17-2C 4' SPEC		18" RCP	18'	CRUM CREEK
20-2C 4' SPEC.	1304	20-3C END 18" RC	17-2C 4' SPEC	17-3C END 18" RC		18" RCP		CRUM CREEK
20-4C STONE HD	1305	20-5C END 30" RC	17-4C STONE HD	17-5C END 30" RC		30" RCP	40'	CRUM CREEK
20-6C 6' GRATE	1240	20-7C 6' GRATE	23-45C 6' GRATE	23-46C 6' GRATE	1972	36" RCP/PVT	291	CRUM CREEK
20-7C 6' GRATE	1245	20-8C 6' GRATE	23-46C 6' GRATE	23-51C 6' GRATE	1972	36" RCP/PVT	255'	CRUM CREEK
20-8C 6' GRATE	1246	20-9C 6' GRATE	23-51C 6' GRATE	23-52C 6' GRATE	1972	48" RCP/PVT	216'	CRUM CREEK
20-9C 6' GRATE	1247	20-10C 6' GRATE	23-52C 6' GRATE	23-53C 6' GRATE	1972	48" RCP/PVT	177'	CRUM CREEK
21-100C #1 OM Inl	1890	21-101C #1 OM Inl	18-35 #1 OM Inlet	18-34 #1 OM Inlet	1954	15" RCP	90'	CRUM CREEK
21-101C #1 OM Inl	1891	21-102C #1 OM &	18-34 #1 OM Inlet	18-36 #1 OM & Hea	1954	24" RCP	233'	CRUM CREEK
21-102C #1 OM &	1892	21-103C #1 OM Inl	18-36 #1 OM & Hea	18-37 #1 OM Inlet	1954	24" RCP	34'	CRUM CREEK
21-103C #1 OM Inl	1893	21-104C #1 OM Inl	18-37 #1 OM Inlet	18-38 #1 OM Inlet	1954	27" RCP	74'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-104C #1 OM (N)	1930	21-103C Stone HD	18-38 #1 OM	18-39 Stone HDW	1954	60" RCP	160'	CRUM CREEK
21-106C 4' GRATE	1629	21-107C 4' GRATE	19-189C 4' GRATE	19-188C 4' GRATE	1974	15" RCP	28'	CRUM CREEK
21-107C 4' GRATE	1628	21-109C 4' GRATE	19-188C 4' GRATE	19-190C 4' GRATE	1974	15" RCP	150'	CRUM CREEK
21-108C 4' GRATE	1625	21-109C 4' GRATE	19-191C 4' GRATE	19-190C 4' GRATE	1974	15" RCP	32'	CRUM CREEK
21-109C 4' GRATE	1626	21-111C 4' GRATE	19-190C 4' GRATE	19-172C 4' GRATE	1974	15" RCP	443'	CRUM CREEK
21-110C Type C	1950	21-120C 4' Grate	18-127 Type C	18-128 4' Grate	1995	21" RCP	223'	CRUM CREEK
21-110C 4' GRATE	1608	21-111C 4' GRATE	19-171 4' GRATE	19-172C 4' GRATE	1962	15" RCP	28'	CRUM CREEK
21-111C 4' GRATE	1609	21-112C 4' GRATE	19-172C 4' GRATE	19-173C 4' GRATE	1963	18" RCP	12'	CRUM CREEK
21-112C 4' SPEC	1607	21-113C 4' GRATE	19-154C 4' SPEC.	19-173C 4' GRATE	1963	21" RCP	32'	CRUM CREEK
21-113C 4' GRATE	1610	21-114C 4' SPEC	19-177C 4' GRATE	19-176C 4' SPEC	1963	21" RCP	18'	CRUM CREEK
21-114C 4' SPEC	1611	21-121C 4' SPEC.	19-175C 4' SPEC	19-176C 4' SPEC	1963	21" RCP	53'	CRUM CREEK
21-115C 4' SPEC	1613	21-117C 4' SPEC	19-182C 4' SPEC.	19-181C 4' SPEC	1963	21" RCP	51'	CRUM CREEK
21-116C 4' GRATE	1612	21-117C 4' SPEC.	19-180C 4' GRATE	19-181C 4' SPEC	1962	15" RCP	32'	CRUM CREEK
21-117C 4' SPEC	1614	21-119C M.H	19-181C 4' SPEC	19-179C M.H.	1963	24" RCP	25'	CRUM CREEK
21-118C 4' GRATE	1615	21-119C M.H	19-179C 4' GRATE	19-179C M.H.	1963	15" RCP	45'	CRUM CREEK
21-119C M.H	1616	21-120C 4' SPEC	19-179C M.H.	19-177C 4' SPEC	1963	24" RCP	8'	CRUM CREEK
21-11C Type C	1971	Conn to Exist 21"	18-129 Type C	Conn to Exist 21"	1995	18" RCP	6'	CRUM CREEK
21-120C 4' SPEC.	1617	21-83C 4' SPEC.	19-177C 4' SPEC.	19-176C 4' SPEC	1963	207 RCP	42'	CRUM CREEK
21-121C 4' SPEC.	1899	21-55C 6' SPEC	19-176 4' Spec	18-46 6' Spec	1963	36" RCP	211'	CRUM CREEK
21-122C 4' SPEC.	1592	21-124C 4' GRATE	19-111C 4' SPEC.	19-112C 4' GRATE	1958	18" RCP	80'	CRUM CREEK
21-123C 4' GRATE	1551	21-124C 4' GRATE	19-112C 4' GRATE	19-113C 4' GRATE	1958	24" RCP	113'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-125C 4' GRATE	1253	21-126C 4' GRATE	19-113C 4' GRATE	19-115C 4' GRATE	1958	18" RC UD	272'	CRUM CREEK
21-126C 6' SPEC.	1254	21-126C 4' GRATE	19-114C 6' SPEC.	19-115C 4' GRATE	1958	18" RCP	64'	CRUM CREEK
21-127C TYPE C	1207	21-139C M.H.	19-170C TYPE C	23-46C M.H.	1985	18" ADMP	78'	CRUM CREEK
21-128C 4' SPEC	1256	21-129C 4' STREET	23-62C 4' SPEC	23-63C 4' SPEC.	1932	18" RCP PVC	122'	CRUM CREEK
21-129C 4' SPEC	1872	21-130C 4' SPEC.	23-63 4' SPEC	18-29 4' SPEC	1932	18" RCP Pvt	84'	CRUM CREEK
21-12C 6' Grate	1972	21-13C Conc HDW	18-128 4' Grate	18-129 Conc HDW	1995	21" RCP	110'	CRUM CREEK
21-131C 6' Grate	1875	21-132 4' Spec	18-27 6' Grate	18-28 4' Spec	1972	18" RCP Pvt	17'	CRUM CREEK
21-132C 4' Spec	1877	21-133C 6' Grate	18-25 4' Spec	18-24 6' Grate	1972	18" RCP Pvt	62'	CRUM CREEK
21-133C 6' Grate	1878	21-134C 6' Grate	18-24 6' Grate	18-22 6' Grate	1972	18" RCP Pvt	317'	CRUM CREEK
21-134C 6' Grate	1884	End 24"	18-22 6' Grate	End 24"	1972	24" RCP Pvt		CRUM CREEK
21-136C TYPE C	1203	21-138C M.H.	23-9C TYPE C	23-46C M.H.	1958	18" RCP	198'	CRUM CREEK
21-137C TYPE C	1204	21-138C M.H.	23-7C TYPE C	23-8C M.H.	1995	18" RCP	15'	CRUM CREEK
21-139C M.H.	1209	21-141C TYPE C	23-8C M.H.	23-9C TYPE C	1958	18" RCP	87'	CRUM CREEK
21-140C TYPE C	1210	21-141C TYPE C	23-10C TYPE C	23-9C TYPE C	1955	18" CMP	121'	CRUM CREEK
21-141C TYPE C	1186	21-140C TYPE C	23-9C 4' SPEC	24-111C TYPE C	1985	18" RCP	142'	CRUM CREEK
21-142C 4' GRATE	1219	21-143C 4' GRATE	23-21C 4' GRATE	23-27C 4' GRATE	1958	18" RC UD	248'	CRUM CREEK
21-143C 4' GRATE	1219	21-144C 6' GRATE	23-22C 4' GRATE	23-23C 6' GRATE	1958	18" RC UD	248'	CRUM CREEK
21-144C 6' GRATE	1221	21-145C 6' GRATE	23-23C 6' GRATE	23-26C 6' GRATE	1958	24" RCP UD	83'	CRUM CREEK
21-145C 6' GRATE	1223	21-146C 6' GRATE	23-28C 6' GRATE	23-24C 6' GRATE	1958	24" RCP UD	399'	CRUM CREEK
21-146C 6' GRATE	1227	21-147C 6' GRATE	23-24C 6' GRATE	23-25C 6' GRATE	1958	24" RC UD	224'	CRUM CREEK
21-147C 6' GRATE	1232	21-4C 6' GRATE	23-25C 6' GRATE	23-26C 6' GRATE	1958	30" RC UD	372'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-148C 4' GRATE	1220	26-2C CONN 18"	23-35C 4' GRATE	23-36C CONN TO	1958	18" RCP	12'	CRUM CREEK
21-149C 4' SPEC.	1188	26-3C 4' GRATE	24-111C 4' SPEC	24-112C 4 GRATE	1985	24" RCP	252'	CRUM CREEK
21-14C Stone Conc	1963	21-15C Stone Conc	18-92 Stone Conc C	18-93 Stone Conc C		12'x7' Box Culvert	68'	CRUM CREEK
21-150C 4' SPEC.	1184	21-151C 4' SPEC.	24-106C 4' SPEC.	24-107C 4' SPEC	1985	15" RCP	60'	CRUM CREEK
21-151C 4' SPEC.	1185	26-3C 4' SPEC	24-107C 4' SPEC.	24-109C 4' SPEC	1985	15" RCP	53'	CRUM CREEK
21-16C #1 OM	1939	21-17C #1 OM	18-86 #1 OM	18-87 #1 OM	1954	15" RCP	34'	CRUM CREEK
21-17C #1 OM	1940	21-18C #1 OM & G	18-87 #1 OM	18-88 #1 OM & Gra	1954	18" RCP	176'	CRUM CREEK
21-18C #1 OM & G	1941	21-19C Stone HDW	18-88 #1 OM & Gra	18-89 Stone HDW	1954	18" RCP	125'	CRUM CREEK
21-1C Type C	1961	21-3C MH	18-118 Type C	18-119 MH	1995	18" RCP	4'	CRUM CREEK
21-20C Conc HDW	1947	21-21C 4' Spec	18-98 Conc HDW	18-112 4' Spec		24" RCP	8'	CRUM CREEK
21-21C 4' Spec	1952	21-22C 6' Spec	18-112 4' Spec	18-94 4' Spec		24" RCP	45'	CRUM CREEK
21-22C 6' Spec	1953	21-23C 4' Spec	18-113 6' Spec	18-99 6' Spec		15" RCP	8'	CRUM CREEK
21-23C 6' Spec	1954	21-24C RR Tie End	18-99 6' Spec	18-115 RR Tie End		24" RCP	20'	CRUM CREEK
21-25C Conc HDW	1956	21-26C Conc HDW	18-105 Conc HDW	18-106 Conc HDW			42'	CRUM CREEK
21-27C Stone HDW	1956	21-28C End CMP	18-107 Stone HDW	18-108 End CMP		12" CMP	75'	CRUM CREEK
21-29C Conc HDW	1957	21-31C Conc HDW	18-110 Conc HDW	18-111 Conc HDW		15" RCP	100'	CRUM CREEK
21-2C Type C	1952	21-3C MH	18-120 Type C	18-119 MH		18" RCP	60'	CRUM CREEK
21-30C End 12" CI	1958	Junct 15" RCP	18-105 End 12" CIP	Junct 15" RCP		12 CIP	80'	CRUM CREEK
21-32C #1 OM	1937	21-33C #1 OM	18-83 #1 OM	18-84 #1 OM	1954	15" RCP	34'	CRUM CREEK
21-33C #1 OM	1938	21-34C Stone HDW	18-84 #1 OM	18-85 Stone HDW	1954	15" RCP	160'	CRUM CREEK
21-35C Stone HDW	1944	21-36C #1 OM & G	18-94 Stone HDW	18-95 #1 OM & Gra	1954	18" RCP	12'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-36C #1 OM & G	1945	21-37C #1 OM & G	18-95 #1 OM & Gra	18-96 #1 OM & Gra	1958	18" RCP	40'	CRUM CREEK
21-37C #1 OM & G	1946	21-38C Stone HDW	18-96 #1 OM & Gra	18-97 Stone HDW	1958	18" RCP	12'	CRUM CREEK
21-39C Conc HDW	1950	21-40C 4' Spec	18-103 Conc HDW	18-104 4' Spec		36" RCP	35	CRUM CREEK
21-30C MH	1963	21-41C Type C	18-119 MH	18-121 Type C		18" RCP	118'	CRUM CREEK
21-40C 4' Spec	1951	21-41C End Sec	18-104 4' Spec	18-114 End Sec				CRUM CREEK
21-42C 4' Grate	1949	21-43C 4' Spec	18-102 4' Grate	18-28 4' Spec	1973	18" RCP	40'	CRUM CREEK
21-43C 4' Spec	1874	21-131C 6' Grate	18-28 4' Spec	18-27 6' Grate	1972	18" RCP Pvt	140'	CRUM CREEK
21-44C Stone HDW	1934	21-45C Stone HDW	18-79 Stone HDW	18-80 Stone HDW		10'x7' Stone & Conc	30'	CRUM CREEK
21-46C #1 OM	1894	21-49C3 #1 OM	18-40 #1 OM	18-43 #1 OM	1949	18" RCP	24'	CRUM CREEK
21-47C #1 OM	1895	21-49C4 #1 OM	18-41 #1 OM	18-43 #1 OM	1949	15" RCP	36'	CRUM CREEK
21-48C #1 OM	1896	21-49C3 #1 OM	18-42 #1 OM	18-43 #1 OM	1949	15" RCP	30'	CRUM CREEK
21-49C3 #1 OM	1897	21-50C MH	18-43 #1 OM	18-44 MH	1949	24" RCP	152'	CRUM CREEK
21-40C Type C	1964	21-7C Type C	18-121 Type C	18-124 Type C		18" RCP	186'	CRUM CREEK
21-50C MH	2008	21-51C Stone HDW	18-44C MH	19-45C Stone HDW	1949	24" RCP	120'	CRUM CREEK
21-52C Stone HDW	1935	21-54C MH	18-76 Stone HDW	18-77 MH		18" CIP	60'	CRUM CREEK
21-53C MH	2009	21-54C END 24" R	18-77 MH	18-79 END 24" RC		24" RCP		CRUM CREEK
21-56C 6' Spec	1900	21-58C 4' Grate	18-46 6' Spec	18-48 4' Grate	1963	42" RCP	65'	CRUM CREEK
21-56C 4' Grate	1902	21-57C 4' Grate	18-75 4' Grate	18-74 4' Grate	1964	15" RCP	30'	CRUM CREEK
21-57C 4' Grate	1904	21-58C 4' Grate	18-74 4' Grate	18-48 4' Grate	1964	18" RCP	36'	CRUM CREEK
21-58C 4' Grate	1901	21-56C MH	18-48 4' Grate	18-51 MH	1963	42" RCP	54'	CRUM CREEK
21-59C 6' Spec	1902	21-62C 4' Grate	18-47 6' Spec	18-73 4' Grate	1962	18" RCP	54'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-5C Type C	1905	21-6C MH	18-122 Type C	18-123 MH	1995	18" RCP	88'	CRUM CREEK
21-60C 4' Grate	1905	21-62C 4' Grate	18-71 4' Grate	18-73 4' Grate	1964	15" RCP	25'	CRUM CREEK
21-61C 4' Grate	1906	21-62C 4' Grate	18-72 4' Grate	18-73 4' Grate	1964	15" RCP	16'	CRUM CREEK
21-62C 4' Grate	1907	21-63C 4' Spec	18-73 4' Grate	18-49 4' Spec	1964	15" RCP	24'	CRUM CREEK
21-63C 4' Spec	1908	21-64C 4' Spec	18-49 4' Spec	18-50 4' Spec	1963	21" RCP	84'	CRUM CREEK
21-64C 4' Spec	1909	21-65C MH	18-50 4' Spec	18-51 MH	1963	21" RCP	7'	CRUM CREEK
21-65C MH	1910	21-69C MH	18-51 MH	18-52 MH	1963	48" RCP	224'	CRUM CREEK
21-66C 4' Grate	1911	21-67C 6' Grate	18-55 4' Grate	18-54 6' Grate	1965	15" RCP	Stand Pipe	CRUM CREEK
21-67C 6' Grate	1912	21-68C 4' Spec	18-54 6' Grate	18-53 4' Spec	1963	21" RCP	58'	CRUM CREEK
21-68C 4' Spec	1913	21-69C MH	18-53 4' Spec	18-52 MH	1963	21" RCP	6'	CRUM CREEK
21-69C MH	1914	21-70C MH	18-52 MH	18-56 MH	1963	42" RCP	150'	CRUM CREEK
21-6C MH	1906	21-7C Type C	18-123 MH	18-124 Type C	1995	18" RCP	46'	CRUM CREEK
21-70C MH	1915	21-74C MH	18-56 MH	18-57 MH	1963	42" RCP	116'	CRUM CREEK
21-71C 4' Grate	1916	21-72C 6' Grate	18-60 4' Grate	18-59 6' Grate	1963	15" RCP	Stand Pipe	CRUM CREEK
21-72C 6' Grate	1917	21-73C 4' Spec	18-59 6' Grate	18-58 4' Spec	1963	18" RCP	21'	CRUM CREEK
21-73C 4' Spec	1918	21-74C MH	18-58 4' Spec	18-57 MH	1963	18" RCP	6'	CRUM CREEK
21-74C MH	1919	21-75C MH	18-57 MH	18-60 MH	1963	48" RCP	68'	CRUM CREEK
21-75C MH	1920	21-79C MH	18-60 MH	18-64 MH	1963	48" RCP	127'	CRUM CREEK
21-76C 4' Spec	1921	21-77C 4' Spec	18-61 4' Spec	18-62 4' Spec	1963	18" RCP	44'	CRUM CREEK
21-77C 4' Spec	1922	21-78C 4' Spec	18-62 4' Spec	18-63 4' Spec	1963	18" RCP	23'	CRUM CREEK
21-78C 4' Spec	1923	21-79C MH	18-63 4' Spec	18-64 MH	1963	18" RCP	26'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
21-79C MH	1934	21-80C MH	18-64 MH	18-65 MH	1963	48" RCP	207'	CRUM CREEK
21-7C Type C	1967	21-8C Type C	18-124 Type C	18-125 Type C	1995	18" RCP	39'	CRUM CREEK
21-82C #1 OM & G	1929	21-83C #1 OM & G	18-76 #1 OM & Gra	18-77 #1 OM & Gra	1953	15" RCP	37'	CRUM CREEK
21-83C #1 OM & G	1930	21-85C #1 OM	18-77 #1 OM & Gra	18-67 #1 OM	1952	18" RCP	150'	CRUM CREEK
21-84C Stone HDW	1926	21-85C #1 OM	18-66 Stone HDW	18-67 #1 OM	1953	15" RCP	90'	CRUM CREEK
21-85C #1 OM	1927	21-86C #1 OM	18-67 #1 OM	18-69 #1 OM	1953	24" RCP	58'	CRUM CREEK
21-86C #1 OM	1928	21-87C Stone HDW	18-69 #1 OM	18-69 Stone HDW	1953	27" RCP	132'	CRUM CREEK
21-88C #1 OM	1931	21-89C #1 OM	18-79 #1 OM	18-79 #1 OM	1953	36" RCP	24'	CRUM CREEK
21-89C #1 OM	1932	21-90C Stone HDW	18-79 #1 OM	18-80 Stone HDW	1953	21" RCP	105'	CRUM CREEK
21-8C Type C	1968	21-9C Type C	18-125 Type C	18-126 Type C	1995	21" RCP	102'	CRUM CREEK
21-91C #1 OM	1942	21-92C Stone HDW	18-90 #1 OM	18-91 Stone HDW	1954	15" RCP	145'	CRUM CREEK
21-93C 4' Grate	1948	21-94C Stone HDW	18-100 4' Grate	18-101 Stone HDW	1950	15" RCP	115'	CRUM CREEK
21-95C #1 OM & G	1956	21-96C Stone HDW	18-81 #1 OM & Gra	18-82 Stone HDW	1954	15" RCP	170'	CRUM CREEK
21-97C MH	1887	21-99C 6' Grate	18-31 MH	18-33 6' Grate	1954	24" RCP Pvt	45'	CRUM CREEK
21-9MC Stone HDW	1888	21-99C 6' Grate	18-33 Stone HDW	18-32 6' Grate	1954	24" RCP	110'	CRUM CREEK
21-99C 6' Grate	1889	21-10C #1 OM Inl	18-32 6' Grate	18-34 #1 OM Inlet	1954	24" RCP	166'	CRUM CREEK
21-9C Type C	1969	21-10C Type C	18-126 Type C	18-127 Type C	1995	21" RCP	50'	CRUM CREEK
22-100C 4' SQ GR	1585	22-101C 4' SQ GR	19-145C 4' SQ GR	19-147C 4' SQ GR	1963	30" RCP PVT	150'	CRUM CREEK
22-101C 4' SQ GR	1586	22-102C JUNCT @	19-147C 4' SQ GR	19-138C JUNCT @	1963	30" RCP PVT	340'	CRUM CREEK
22-103C 6' SPEC	1444	22-104C 6' SPEC.	19-1 6' SPEC	19-2 6' SPEC.	1957	18" RCP	34'	CRUM CREEK
22-10NC 6' SPEC	1445	22-105C 4' GRATE	19-2 6' SPEC.	19-3 4' GRATE	1957	21" RCP	87'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-105C 4' GRATE	1446	22-106C JUNCT M	19-3 4' GRATE	19-4 JUNCT M.H.	1957	21" RCP	58	CRUM CREEK
22-106C JUNCT. M.	1447	22-107C 4' GRATE	19-4 JUNCT. BOX	19-5 4' GRATE	1964	24" RCP	190'	CRUM CREEK
22-107C 4' GRATE	1448	22-108C 4' GRATE	19-5 4' GRATE	19-6 4' GRATE	1964	24" RCP	624'	CRUM CREEK
22-108C 4' GRATE	1449	22-109C 4' GRATE	19-6 4' GRATE	19-7 4' GRATE	1964	24" RCP	202'	CRUM CREEK
22-109C 4' GRATE	1451	22-110C BOX CUL.	19-7 4' GRATE	19-8 BOX CULV.	1964	24" RCP	160'	CRUM CREEK
22-110C 4' PDIT SPE	1448	22-111C 4' SPEC.	19-104C 4' PDIT SP	19-108C 4' SPEC	1955	24" RCP	205'	CRUM CREEK
22-110C BOX CUL.	1452	22-111C 36" PIPE	19-8 BOX CULV	19-9 36" PIPE OUT		7-6'X3' BOX CUL	4-185	CRUM CREEK
22-111C 36" PIPE	1451	22-112C 6' GRATE	19-9 36" PIPE OUT	19-10 6' GRATE IN		36" RCP	30'	CRUM CREEK
22-112C 4' GRATE	1455	22-113C 6' GRATE	19-14 4' GRATE	19-10 6' GRATE IN	1958	18" RCP	310'	CRUM CREEK
22-113C 4' GRATE	1456	22-114C JUNCT. I	19-15 4' GRATE	19-16 JUNCT. 18"	1958	18" RCP	10'	CRUM CREEK
22-114C 6' GRATE	1457	22-115C 4' GRATE	19-10 6' GRATE IN	19-12 4' GRATE	1958	36" RCP	68'	CRUM CREEK
22-115C 4' GRATE	1458	22-117C 4' GRATE	19-11 4' GRATE	19-12 4' GRATE	1958	18" RCP	60'	CRUM CREEK
22-117C 4' GRATE	1459	22-118C M.H. GRA	19-12 4' GRATE	19-13 M.H. GRATE		36" RCP	56'	CRUM CREEK
22-119C M.H. GRA	1375	22-119C M.H. GRA	20-13 M.H. GRATE	20-96 M.H. GRATE	1960	36" RCP	150'	CRUM CREEK
22-119C M.H. GRA	1374	22-120C M.H. GRA	20-96 M.H. GRATE	20-97 M.H. GRATE	1969	36" RCP	52'	CRUM CREEK
22-11C 4' SPEC.	1349	22-12C 4' SPEC.	19-108C 4' SPEC	19-109C 4' SPEC	1958	24" RCP	32'	CRUM CREEK
22-120C M.H. GRA	1442	22-121C M.H. GRA	20-97 M.H. GRATE	20-98 M.H. GRATE	1969	42" RCP	164'	CRUM CREEK
22-121C M.H. GRA	1460	22-123C HDW @ C	20-98 M.H. GRATE	19-17 HDW @ CH	1969	48" RCP	98'	CRUM CREEK
22-122C 3' GRATE	1461	22-123C HDW @ C	19-18 3' GRATE	19-17 HDW @ CH		12" RCP	100'	CRUM CREEK
22-123C HDW @ C	1462	22-124C HDW @ B	19-17 HDW @ CH	19-19 HDW @ DO	1975	8'x3' STONE MAS	173'	CRUM CREEK
22-125C 2- #1 OM	1097	22-126C #1 OM	24-1C 2- #1 OM	24-2C #1 OM	1953	18" RCP	27'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-126C #1 CM	1580	22-98C 4' SQ GRA	24-3C #1 CM	19-143C 4' SQ GR	1953	18" RCP	180'	CRUM CREEK
22-127C CONC HD	1111	22-4 NC CONC HD	24-7C CONC HDW	22-1.8C CONC HD	1964	8'x18' 2-3' Rip-Rap	1-HPIII'	CRUM CREEK
22-12C 4' SPEC	1550	22-13C M H	19-109C 4' SPEC	19-111C M H	1958	24" RCP	88'	CRUM CREEK
22-13C 4' GRATE	1556	22-14C 4' GRATE	19-116C 4' GRATE	19-117C 4' GRATE	1958	18" RCP	64'	CRUM CREEK
22-14C 4' GRATE	1557	22-15C 4' GRATE	19-117C 4' GRATE	19-118C 4' GRATE	1958	18" RC UD	108'	CRUM CREEK
22-15C 4' GRATE	1558	22-17C 4' GRATE	19-118C 4' GRATE	19-119C 4' GRATE	1958	24" RC UD	96'	CRUM CREEK
22-16C 4' GRATE	1559	22-17C 4' GRATE	19-120C 4' GRATE	19-119C 4' GRATE	1958	18" RCP	64'	CRUM CREEK
22-17C 4' GRATE	1560	22-18C M.H.	19-119C 4' GRATE	19-119C M H	1958	24" RC UD	76'	CRUM CREEK
22-18C M.H.	1561	22-20C M.H.	19-119C M.H.	19-121C M H	1958	30" RC UD	288'	CRUM CREEK
22-19C 4' GRATE	1562	22-20C M H	19-122C 4' GRATE	19-121C M H.	1958	18" RCP	64	CRUM CREEK
22-1C 4' GRATE	1618	22-3C 4' GRATE	19-183C 4' GRATE	19-184C 4' GRATE	1974	15" RCP	211'	CRUM CREEK
22-20C M.H	1563	22-22C 4' GRATE	19-121C M.H	19-123C 4' GRATE	1958	30" RC UD	504'	CRUM CREEK
22-21C 6' SPEC	1564	22-22C 4' GRATE	19-124C 6' SPEC	19-123C 4' GRATE	1958	18" RCP	64'	CRUM CREEK
22-22C 4' GRATE	1565	22-23C M H	19-123C 4' GRATE	19-125C M H.	1958	30" RC UD	308'	CRUM CREEK
22-23C M H.	1566	22-24C 4' SPEC	19-125C M H	19-126C 4' SPEC.	1958	30" RC UD	224	CRUM CREEK
22-24C 4' SPEC.	1567	22-92C 10X7' CON	19-126C 4' SPEC	19-53C 10X7' CON	1958	30" RC UD	56'	CRUM CREEK
22-25C 4' GRATE	1524	22-26C 4' GRATE J	19-85C 4' GRATE	19-62C 4' GRATE J	1959	24" RCP	64'	CRUM CREEK
22-26C 4' GRATE J	1525	22-30C 6' SPEC.	19-53C 4' GRATE J	19-83C 6' SPEC	1959	18" RCP	148'	CRUM CREEK
22-27C 4' SPEC.	1526	22-28C 4' SPEC.	19-88C 4' SPEC	19-87C 4' SPEC.	1959	15" RCP	58'	CRUM CREEK
22-28C 4' SPEC.	1527	22-29C 4' SPEC.	19-87C 4' SPEC	19-86C 4' SPEC	1959	15" RCP	45'	CRUM CREEK
22-29C 4' SPEC.	1528	22-30C 6' SPEC	19-86C 4' SPEC	19-83C 6' SPEC	1959	15" RCP	128'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-2C 4' GRATE	1519	22-3C 4' GRATE	19-165C 4' GRATE	19-154C 4' GRATE	1974	15" RCP	22'	CRUM CREEK
22-30C 4' SPEC	1539	22-31C 6' GRATE	19-83C 6' SPEC.	19-84C 6' GRATE	1959	54" RCP	30	CRUM CREEK
22-31C 6' GRATE	1540	22-32 JUNCT BO	19-84C 6' GRATE	19-89C JUNCT. BO	1975	54" RCP	15'	CRUM CREEK
22-32 JUNCT BO	1531	22-34C 4' SPEC	19-89C JUNCT BO	19-90C 4' SPEC	1975	54" RCP	44'	CRUM CREEK
22-33C 4' SPEC.	1532	22-34C 4' SPEC	19-91C 4' SPEC	19-90C 4' SPEC	1975	15" RCP	34'	CRUM CREEK
22-34C 4' SPEC.	1533	22-35C 4' SPEC	19-90C 4' SPEC	19-93C 4' SPEC.	1975	54" RCP	190'	CRUM CREEK
22-35C 4' SPEC.	1534	22-37C 4' SPEC	19-93C 4' SPEC.	19-94C 4' SPEC	1975	54" RCP	170	CRUM CREEK
22-36C 4' SPEC.	1535	22-37C 4' SPEC	19-93C 4' SPEC.	19-94C 4' SPEC.	1975	15" RCP	37	CRUM CREEK
22-37C 4' SPEC	1536	22-39C 4' SPEC.	19-94C 4' SPEC	19-95C 4' SPEC.	1975	60" RCP	70	CRUM CREEK
22-38C 4' SPEC	1537	22-39C STONE HD	19-95C 4' SPEC	19-96C STONE HD	1975	60" RCP	112'	CRUM CREEK
22-3C 4' GRATE	1430	22-4C 4' GRATE	19-184C 4' GRATE	19-186C 4' GRATE	1974	15" RCP	103'	CRUM CREEK
22-40C #1 OM	1510	22-41C #1 OM	19-69C #1 OM	19-68C #1 OM	1954	15" RCP	35'	CRUM CREEK
22-41C #1 OM	1511	22-42C #1 OM	19-68C #1 OM	19-70C #1 OM	1954	18" RCP	65'	CRUM CREEK
22-42C #1 OM	1512	22-40C 4' SPEC	19-70C #1 OM	19-71C 4' SPEC	1966	21" RCP	340'	CRUM CREEK
22-43C 4' SPEC	1513	22-44C 4' SPEC	19-71C 4' SPEC	19-73C 4' SPEC.	1966	24" RCP	220'	CRUM CREEK
22-44C 4' SPEC.	1514	22-45C 4' SPEC	19-73C 4' SPEC.	19-73C 4' SPEC	1966	24" RCP	278'	CRUM CREEK
22-45C 4' SPEC	1515	22-46C JUNCT BO	19-73C 4' SPEC.	19-74C JUM. T BO	1966	30" RCP	220'	CRUM CREEK
22-46C JUNCT BO	1516	22-49C 2-4' SPEC. I	19-74C JUNCT BO	19-59C 2-4' SPEC. I	1966	30" RCP	50'	CRUM CREEK
22-47C STONE HD	1520	22-48C 6' SPEC	19-76C STONE HD	19-75C 6' SPEC	1959	48" RCP	227'	CRUM CREEK
22-48C 6' SPEC	1521	22-49C 2-4' SPEC. I	19-75C 6' SPEC	19-59C 2-4' SPEC. I		36" RCP	30'	CRUM CREEK
22-49C 2-4' SPEC. I	1530	22-66C Junct Box	19-59C 2-4' SPEC. I	19-58C Junct Box	1974	58"x36" CORR. I P	126	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-45C 4' GRATE	1621	22-63C 4' GRATE	19-157C 4' GRATE	19-156C 4' GRATE	1974	15" RCP	22'	CRUM CREEK
22-59C CONC. HD	1499	22-66C Junct. Box	19-57C CONC. HD	19-58C Junct. Box	1974	81"x59" CORR. E.P.	180'	CRUM CREEK
22-51C 6' GRATE	1497	22-52C 6' GRATE	19-54C 6' GRATE	19-55C 6' GRATE	1974	18" RCP	96'	CRUM CREEK
22-52C 6' GRATE	1498	22-66C 6' GRATE	19-55C 6' GRATE	19-66C 6' GRATE	1974	18" RCP	104'	CRUM CREEK
22-53C 4' SPEC	1468	22-54C 6' GRATE	19-26C 4' SPEC	19-27C 6' GRATE	1963	15" RCP	66'	CRUM CREEK
22-54C 6' GRATE	1469	22-55C 6' GRATE	19-27C 6' GRATE	19-28C 4' GRATE		18" RCP	325'	CRUM CREEK
22-55C 4' GRATE	1470	22-56C 4' GRATE	19-28C 4' GRATE	19-29C 4' GRATE	1969	15" RCP	24'	CRUM CREEK
22-56C 4' GRATE	1471	22-57C M.H. JUNC	19-29C 4' GRATE	19-32C M.H. JUNC		21" RCP	140'	CRUM CREEK
22-57C M.H. JUNC	1472	22-58C M.H.	19-32C M.H. JUNC	19-33C M.H.	1983	21" RCP	66'	CRUM CREEK
22-58C M.H.	1473	22-59C 5'-9" GRAT	19-33C M.H.	19-39C 5'-9" GRAT	1963	21" RCP	140'	CRUM CREEK
22-59C 5'-9" GRAT	1474	22-60C 6' SPEC.	19-39C 5'-9" GRAT	19-40C 6' SPEC.	1961	24" RCP	96'	CRUM CREEK
22-5C 4' GRATE	1622	21-107C 4' GRATE	19-156C 4' GRATE	19-158C 4' GRATE	1974	15" RCP	121'	CRUM CREEK
22-60C 6' SPEC	1475	22-61C 6' SPEC.	19-40C 6' SPEC	19-41C 6' SPEC.	1961	24" RCP	28'	CRUM CREEK
22-61C 6' SPEC	1465	22-62C 4' GRATE	19-41C 6' SPEC.	19-46C 4' GRATE	1961	24" RCP	16'	CRUM CREEK
22-62C 4' GRATE	1493	22-63C 4' GRATE	19-46C 4' GRATE	19-47C 4' GRATE		36" CMP	148'	CRUM CREEK
22-63C 4' GRATE	1494	22-64C 5'-9"x11' GR	19-47C 4' GRATE	19-53C 5'-9"x11' GR		36" RCP	256'	CRUM CREEK
22-64C 5'-9"x11' GR	1495	22-65C 6' GRATE	19-53C 5'-9"x11' GR	19-56C 6' GRATE	1964	36" RCP	92'	CRUM CREEK
22-65C 6' GRATE	1496	22-66C Junct. Box	19-56C 6' GRATE	19-55C Junct. Box	1964	36" RCP	60'	CRUM CREEK
22-66C Junct. Box	150'	22-72C Junct. Box	19-58C JUNCT. BOX	19-63C Junct. Box	1974	112"x75" CORR. E.	320'	CRUM CREEK
22-67C 6' GRATE	1504	22-68C 6' GRATE	19-65C 6' GRATE	19-64C 6' GRATE	1974	15" RCP	143'	CRUM CREEK
22-68C 6' GRATE	1505	22-69C 6' GRATE	19-64C 6' GRATE	19-63C 6' GRATE	1974	15" RCP	94'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-69C 6' GRATE	1506	22-72C Junct. Box	19-63C 6' GRATE	19-62C Junct. Box	1974	18" RCP	79'	CRUM CREEK
22-68C #1 OM	1517	22-70C #1 OM	19-80C #1 OM	19-79C #1 OM	1950	15" RCP	147'	CRUM CREEK
22-79C 6' GRATE	1502	22-71C 6' GRATE	19-64C 6' GRATE	19-63C 6' GRATE	1974	15" RCP	124'	CRUM CREEK
22-71C 6' GRATE	1503	22-72C Junct. Box	19-63C 6' GRATE	19-62C Junct. Box	1974	18" RCP	135'	CRUM CREEK
22-72C Junct. Box	1508	22-74C Junct. Box	19-62C Junct. Box	19-57C Junct. Box	1974	112"x75" Smooth P	67'	CRUM CREEK
22-73C 6' GRATE	1507	112"x75" PIPE AR	19-66C 6' GRATE	112"x75" PIPE AR	1974		11'	CRUM CREEK
22-74C Junct. Box	1509	22-93C MH Junct.	19-57C Junct. Box	19-152C MH Junct.		10'x7' CONC. ARC	112'	CRUM CREEK
22-75C 4' GRATE	1492	10'x7' CONC. ARC	19-51C 4' GRATE	10'x7' CONC. ARC	1958	18" RCP	8'	CRUM CREEK
22-76C 6' SPEC.	1569	22-79C M.H.	19-128C 6' SPEC	19-129C M.H.	1958	18" RCP	28'	CRUM CREEK
22-77C 6' SPEC.	1568	22-78C M.H.	19-131C 6' SPEC.	19-129C M.H.	1958	18" RCP UD	48'	CRUM CREEK
22-78C M.H.	1570	22-79C 4' SPEC.	19-130C M.H.	19-131C 4' SPEC.	1958	18" RCP	88'	CRUM CREEK
22-79C 4' SPEC	1571	22-68L Conn To 70	19-130C 4' SPEC	19-131C Conn To 1	1958	18" RCP	92'	CRUM CREEK
22-70C #1 OM	1518	22-80C #1 OM	19-79C #1 ON	19-78C #1 ON		18" RCP	94'	CRUM CREEK
22-81C 4' GRATE	1463	22-82C 4' GRATE	19-20C 4' GRATE	19-21C 4' GRATE	1958	18" RCP	56'	CRUM CREEK
22-82C 4' GRATE	1464	22-83C 4' PDH SPE	19-21C 4' GRATE	19-22C 4' PDH SPE	1958	18" RCP UD	274'	CRUM CREEK
22-83C 4' PDH SPE	1465	22-85C M.H.	19-22C 4' PDH SPE	19-81C M.H.	1958	18" RCP UD	18'	CRUM CREEK
22-84C 4' SPEC.	1467	22-85C M.H.	19-20C 4' SPEC.	19-21C M.H.	1980	15" CMP	37'	CRUM CREEK
22-85C M.H.	1466	22-86C 4' GRATE	19-81C M.H.	19-83C 4' GRATE	1958	18" RCP	64'	CRUM CREEK
22-86C 4' GRATE	1486	22-87C 4' GRATE	19-23C 4' GRATE	19-22C 4' GRATE	1958	18" RCP	65'	CRUM CREEK
22-87C 4' GRATE	1487	22-89C 4' GRATE	19-24C 4' GRATE	19-23C 4' GRATE	1958	18" RCP UD	206'	CRUM CREEK
22-88C 4' GRATE	1488	22-89C 4' GRATE	19-48C 4' GRATE	19-23C 4' GRATE	1958	18" RCP	64'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
22-86C 4' GRATE	1489	22-90C 4' GRATE	19-25C 4' GRATE	19-49C 4' GRATE	1958	18" RC UD	156'	CRUM CREEK
23-8C #1 OM	1519	22-9C END 24" RC	19-28C #1 OM	19-12C END 24" R		24" RCP	48'	CRUM CREEK
22-90C 4' GRATE	1490	22-91C 4' SPEC	19-49C 4' GRATE	19-50C 4' SPEC	1954	18" RC UD	126'	CRUM CREEK
22-91C 4' SPEC.	1491	23-92C 10X7' CON	19-50C 4' SPEC	19-52C 10X7' CON	1958	18" RC UD	150'	CRUM CREEK
22-93C M H Junct	1588	22-94C M H	19-152C M H Junct	19-153C M H.	1967	8'x5' CONC. BOX	151'	CRUM CREEK
22-94C M H.	1589	22-95C CONC HD	19-153C M H.	19-151C CONC HD	1967	8X5' CONC. BOX	169	CRUM CREEK
22-95C CONC HD	1590	22-96C Conc HDW	19-151C CONC H	19-156C Conc HD	1967	10'-12'x4' Stone Ma	97'	CRUM CREEK
22-96C Conc HDW	1591	22-97C Junct With	19-156C Conc HD	19-155C Junct Wit	1967	12X3' CONC BOX	75'	CRUM CREEK
22-97C Junct With	1592	22-122C CONC HD	19-155C Junct With	24-7C CONC HDW	1963	8'x5' CONC BOX C	458'	CRUM CREEK
22-98C 4' SQ GRA	1561	22-99C 4' SQ GRA	19-143C 4' SQ GR	19-144C 4' SQ GR	1961	24" RCP PVT	305'	CRUM CREEK
22-99C 4' SQ GRA	1583	22-100C 4' SQ GR	19-144C 4' SQ GR	19-145C 4' SQ GR	1962	24" RCP PVT.	341'	CRUM CREEK
23-10C 4' SPEC	1376	22-11C 4' GRATE	20-102 4' SPEC	20-103 4' GRATE	1958	15" RCP	76'	CRUM CREEK
23-11C 4' GRATE	1377	23-12C 4' GRATE	20-103 4' GRATE	20-104 4' GRATE	1958	15" RC UD	260'	CRUM CREEK
23-12C 4' GRATE	1434	22-13C 6' GRATE	20-104 6' GRATE	19-10 6' GRATE IN	1958	18" RC UD	252'	CRUM CREEK
23-13C 6' GRATE	1369	23-14C 2-6' GRAT	20-95 6' GRATE	20-96 2-6' GRATES	1962	18" RCP	225'	CRUM CREEK
23-14C 2-6' GRAT	1368	23-15C 2-6' GRAT	20-93 2-6' GRATES	20-94 2-6' GRATES	1962	18" RCP	223'	CRUM CREEK
23-15C 2-6' GRAT	1370	23-16C M H GRA	20-94 2-6' GRATES	20-100 M H GRAT	1962	27" RCP	186'	CRUM CREEK
23-16C M.H. GRA	1371	23-17C M.H. GRA	20-100 M H GRAT	20-99 M H GRATE	1962	27" RCP	117'	CRUM CREEK
23-17C M H GRA	1372	22-121C M.H. GRA	20-99 M H GRATE	20-98 M.H. GRATE	1962	27" RCP	110'	CRUM CREEK
23-18C BEGIN ST	1346	23-19C STONE HD	20-7 BEGIN STOR	20-6 STONE HDW	1966	2X3' STONE MAS	435'	CRUM CREEK
23-19C STONE HD	1347	23-24C 2-3' GRAT	20-6 STONE HDW	20-5 2-4' GRATES		24" RCP	+-75'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
23-20C 4' GRATE	1350	23-22C 4' GRATE	20-9 4' GRATE	20-8 4' GRATE	1958	15" RCP	48	CRUM CREEK
23-21C 4' GRATE	1348	23-22C 6' GRATE	20-11 4' GRATE	20-10 6' GRATE	1958	18" RCP I.D	132'	CRUM CREEK
23-22C 6' GRATE	1349	23-23C 4' GRATE	20-10 6' GRATE	20-9 4' GRATE	1958	18" RCP I.D	76'	CRUM CREEK
23-23C 4' GRATE	1351	23-24C 2- 4' GRATE	20-8 4' GRATE	20-8 2- 4' GRATES	1958	24" RCP I.D	98'	CRUM CREEK
23-24C (2) 4' GRA	1352	23-28C 4' PDH SPE	20-8 (2) 4' GRATES	20-8 4' PDH SPEC	1958	30" RCP	64'	CRUM CREEK
23-25C 4' GRATE I	1342	23-26C 4' PDH SPE	20-1 4' GRATE INL	20-2 4' PDH SPEC.	1958	18" RCP	44'	CRUM CREEK
23-26C 4' PDH SPE	1343	23-27C 4' PDH SPE	20-2 4' PDH SPEC	20-3 4' PDH SPEC.	1958	15" RCP	64'	CRUM CREEK
23-27C 4' PDH SPE	1344	23-28C 6' PDH SPE	20-3 4' PDH SPEC.	20-4 4' PDH SPEC	1958	18" RCP I.D	210'	CRUM CREEK
23-28C 4' PDH SPE	1353	23-33C 6' GRATE	20-4 4' PDH SPEC	20-13 6' GRATE	1970	24" RCP	140'	CRUM CREEK
23-29C 3' GRATE	1356	23-30C 4' GRATE	20-14 3' GRATE	20-13 4' GRATE	1970	12" RCP	130'	CRUM CREEK
23-30C 4' GRATE	1357	23-32C 6' GRATE	20-13 4' GRATE	20-12 6' GRATE	1970	15" RCP	165'	CRUM CREEK
23-31C 3' GRATE	1354	23-33C 4' GRATE	20-16 3' GRATE	20-15 4' GRATE	1970	12" RCP	150'	CRUM CREEK
23-32C 4' GRATE	1355	23-35C 6' GRATE	20-15 4' GRATE	20-12 6' GRATE	1970	18" RCP	140'	CRUM CREEK
23-33C 6' GRATE	1358	23-36C 6' GRATE	20-12 6' GRATE	20-17 6' GRATE	1970	24" RCP	142'	CRUM CREEK
23-34C 3' GRATE	1360	24-36C 6' GRATE	20-18 3' GRATE	20-17 6' GRATE	1970	15" RCP	155'	CRUM CREEK
23-35C 3' GRATE	1359	23-36C 6' GRATE	20-19 3' GRATE	20-17 6' GRATE	1970	15" RCP	158'	CRUM CREEK
23-36C 6' GRATE	1361	23-37C SPEC GRA	20-17 6' GRATE	20-20 SPEC GRAT	1970	24" RCP	8'	CRUM CREEK
23-37C SPEC GRA	1362	23-38C 6' GRATE	20-20 SPEC GRAT	20-21 6' GRATE	1976		8'	CRUM CREEK
23-38C 6' GRATE	1363	23-39C #1 OM & G	20-21 6' GRATE	20-22 #1 OM & GR	1976	24" / 30" RCPS	146'	CRUM CREEK
23-39C #1 OM & G	1364	23-40C #1 OM & G	20-22 #1 OM & G	20-23 #1 OM & GR	1976	2-30" RCPS	40'	CRUM CREEK
23-40C #1 OM & G	1365	23-41C CONC HD	20-23 #1 OM & G	20-24 CONC HDW	1992	48" CORR. ALUM.	153'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
23-42C M.H.	1414	23-43C 3' GRATE	20-41 M.H.	20-40 3' GRATE	1954	15" RCP	45'	CRUM CREEK
23-43C 3' GRATE	1415	22-44C M.H.	20-40 3' GRATE	20-39 M.H.	1954	15" RCP	185'	CRUM CREEK
23-44C M.H.	1416	23-45C M.H.	20-39 M.H.	20-38 M.H.	1954	15" RCP	146'	CRUM CREEK
23-45C M.H.	1417	23-47C JUNCT BO	20-38 M.H.	20-34 JUNCT BOX	1954	15" RCP	160'	CRUM CREEK
23-46C 4' PDH SPE	1434	23-47C 4' PDH SPE	20-35 4' PDH SPEC	20-36 4' PDH SPEC	1958	18" RCP	35'	CRUM CREEK
23-47C 4' PDH SPE	1435	23-48C JUNCT. BO	20-36 4' PDH SPEC	20-37 JUNCT. BO	1958	18" RCP	32'	CRUM CREEK
23-48C JUNCT. BO	1436	23-56C M.H.	20-37 JUNCT BOX	20-52 M.H.		18" RCP	30'	CRUM CREEK
23-50C 4' PDH SPE	1426	23-51C 4' PDH SPE	20-25 4' PDH SPEC	20-26 4' PDH SPEC	1958	18" RCP	52'	CRUM CREEK
23-51C 4' PDH SPE	1427	23-52C 4' GRATE	20-26 4' PDH SPEC	20-27 4' GRATE	1958	18" RCP UD	104'	CRUM CREEK
23-52C 4' GRATE	1428	23-53C 4' PDH SPE	20-27 4' GRATE	20-28 4' PDH SPEC	1955	15" RCP	64'	CRUM CREEK
23-53C 4' PDH SPE	1429	23-55C 4' PDH SPE	20-28 4' PDH SPEC	20-29 4' PDH SPEC	1958	18" RCP UD	180'	CRUM CREEK
23-54C 4' PDH SPE	1430	23-55C 4' PDH SPE	20-30 4' PDH SPEC	20-29 4' PDH SPEC	1958	18" RCP	64'	CRUM CREEK
23-55C 4' PDH SPE	1431	23-56C 4' PDH SPE	20-29 4' PDH SPEC	20-31 4' PDH SPEC	1958	18" RCP UD	164'	CRUM CREEK
23-56C 3' PDH SPE	1432	23-57C 4' PDH SPE	20-31 4' PDH SPEC	20-32 4' PDH SPEC	1958	18" RCP UD	176'	CRUM CREEK
23-57C 4' PDH SPE	1433	23-58C M.H.	20-32 4' PDH SPEC	20-33 M.H.	1958	18" RCP	48'	CRUM CREEK
22-58C M.H.	1418	21-61C 4' GRATE	20-33 M.H.	20-34 4' GRATE	1952	30" RCP	100'	CRUM CREEK
23-59C 4' PDH SPE	1419	CONN. TO 30" RC	20-42 4' PDH SPEC	CONN. TO 30" RC	1958	18" RCP	46'	CRUM CREEK
23-60C #1 OM	1420	23-61C 4' GRATE	20-44 #1 OM	20-43 4' GRATE	1952	15" RCP	26'	CRUM CREEK
23-61C 4' GRATE	1421	23-62C #1 OM	20-43 4' GRATE	20-45 #1 OM	1952	36" RCP	200'	CRUM CREEK
22-62C #1 OM INL	1422	23-63C GRATE IN	20-45 #1 OM INLE	20-46 GRATE INL	1952	36" RCP	66'	CRUM CREEK
23-63C GRATE IN	1423	23-63C UNKNOW	20-46 GRATE INL	20-47 UNKNOWN		36" RCP	50'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
23-64C END 30" R	1424	23-65C UNKNOW	20-55A END 30" R	20-47 UNKNOWN	1953	30" RCP	210'	CRUM CREEK
23-65C UNKNOW	1425	23-66C #1 OM INL	20-47 UNKNOWN	20-48 #1 OM INLE	1953	42" RCP	285'	CRUM CREEK
23-66C #1 OM INL	1402	23-71C #1 OM INL	20-48 #1 OM INLE	20-49 #1 OM INLE	1952	48" RCP	28'	CRUM CREEK
23-67C #1 OM INL	1403	23-68C #1 OM INL	20-53 #1 OM INLE	20-54 #1 OM INLE	1952	15" RCP	30'	CRUM CREEK
23-69C #1 OM INL	1404	23-70C #1 OM INL	20-54 #1 OM INLE	20-55 #1 OM INLE	1952	15" UNDER DRAI	210'	CRUM CREEK
23-69C #1 OM INL	1405	23-70C #1 OM INL	20-51 #1 OM INLE	20-52 #1 OM INLE	1952	15" UNDER DRAI	45'	CRUM CREEK
23-6C NO 1 OM	1428	23-7C NO 1 OM	20-106 NO 1 OM	20-106 NO 1 OM		30" CORR IRON PI	40'	CRUM CREEK
23-70C #1 OM INL	1406	23-71C #1 OM INL	20-52 #1 OM INLE	20-49 #1 OM INLE	1952	24" RCP	152'	CRUM CREEK
23-71C #1 OM INL	1407	23-72C STONE HD	20-49 #1 OM INLE	20-50 STONE HD	1952	48" RCP	155'	CRUM CREEK
23-73C #1 OM INL	1408	23-74C #1 OM INL	20-55 #1 OM INLE	20-56 #1 OM INLE	1952	18" RCP	28'	CRUM CREEK
23-74C #1 OM INL	1409	23-75C STONEY CR	20-56 #1 OM INLE	20-57 STONEY CR	1952	24" CORR LP	140'	CRUM CREEK
23-76C STONE HD	1410	23-77C STONE HD	20-58 STONE HD	20-59 STONE HD	1952	3'x5' CONC BOX C	67'	CRUM CREEK
23-77C STONE HD	1411	23-78C ENT CHA	20-59 STONE HD	20-60 END CHAN	1970	6'x3' STONE CHA	167'	CRUM CREEK
24-79C HDW STO	1412	23-80C HDW STO	20-61 HDW STON	20-62 HDW STON		5'x9' STONE ARC		CRUM CREEK
23-7C NO 1 OM	1429	23-8C 4' GRATE	20-106 NO 1 OM	20-107 4' GRATE	1970	24" RCP	130'	CRUM CREEK
23-81C 2'x4' GRAT	1392	23-82C 2'x4' GRAT	20-67 2'x4' GRATE	20-66 2'x4' GRATE	1980	12" ACP	120'	CRUM CREEK
23-82C 2'x4' GRAT	1393	23-83C 2'x4' GRAT	20-68 2'x4' GRATE	20-69 2'x4' GRATE	1980	12" ACP	180'	CRUM CREEK
23-83C 2'x4' GRAT	1394	23-85C M H	20-69 2'x4' GRATE	20-71 M H	1980	12" ACP	109'	CRUM CREEK
23-84C 2'x4' GRAT	1395	23-85C M H	20-70 2'x4' GRATE	20-71 M H	1980	12" ACP	193'	CRUM CREEK
23-85C M H	1396	23-86C M H	20-71 M H	20-72 M H	1980	18" ACP	200'	CRUM CREEK
23-86C M H	1397	23-87C M H	20-72 M H	20-73 M H	1980	18" ACP	180'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
23-92C M.H.	1398	24-15C CONC HD	20-73 M.H.	20-74 CONC HDW	1960	18" ACP	446'	CRUM CREEK
23-85C 6' SPEC.	1385	23-89C 6' SPEC	20-62 6' SPEC.	20-65 6' SPEC	1970	18" RCP	66'	CRUM CREEK
23-86C 6' SPEC	1386	24-26C 6' SPEC	20-85 6' SPEC	20-83 6' SPEC	1970	24" RCP	164	CRUM CREEK
23-90C 4' GRATE	1450	23-109C 4' GRATE	20-107 4' GRATE	19-7 4' GRATE	1964	24" RCP	140	CRUM CREEK
23-88C 4' SPEC	1388	23-99C 4' SPEC.	20-86 4' SPEC	20-89 6' SPEC	1970	15" RCP	38'	CRUM CREEK
23-91C 4' SPEC.	1389	23-92C 4' SPEC.	20-89 4' SPEC	20-90 4' SPEC.	1970	18" RCP	215'	CRUM CREEK
23-92C 4' SPEC	1366	23-93C 4' SPEC	20-90 4' SPEC	20-91 4' SPEC	1970	21" RCP	212'	CRUM CREEK
23-93C 4' SPEC.	1367	24-26C 6' SPEC.	20-91 4' SPEC	20-85 6' SPEC.	1970	21" RCP	269'	CRUM CREEK
21-03	2012	3'x6' CONC BOX C						CRUM CREEK
22-05	2013	3'x6' CONC BOX C						CRUM CREEK
23-90C 4' GRATE	1375	23-100C 4' SPEC	20-101 4' GRATE	20-102 4' SPEC	1948	18" RCP	44'	CRUM CREEK
24-37C 4' PDH SPE	1413	24-12C 4' PDH SPE	20-63 4' PDH SPEC	20-64 4' PDH SPEC	1961	18" RCP	28	CRUM CREEK
24-12C 4' PDH SPE	1390	24-13C M.H.	20-64 4' PDH SPEC	20-65 M.H.	1961	18" RCP	109'	CRUM CREEK
24-13C M.H.	1391	24-14C STONE HD	20-65 M.H.	20-66 STONE HD	1961	18" RCP	80'	CRUM CREEK
24-16C CONC. HD	1399	24-30C M.H.	20-75 CONC. HDW	20-77 M.H.	1980	42" RCP	80'	CRUM CREEK
24-17C 6' PDH SPE	1400	24-18C 6' PDH SPE	20-78 6' PDH SPEC	20-79 6' PDH SPEC	1980	15" RCP	74'	CRUM CREEK
24-18C 6' PDH SPE	1401	24-19C 6' PDH SPE	20-79 6' PDH SPEC	20-76 6' PDH SPEC	1980	18" RCP	78'	CRUM CREEK
24-19C 6' PDH SPE	1378	24-20C M.H.	20-76 6' PDH SPEC	20-77 M.H.	1980	21" RCP	113	CRUM CREEK
24-06C M.H.	1379	24-22C 6' PDH GR	20-77 M.H.	20-81 6' PDH GRA	1980	42" RCP	120'	CRUM CREEK
24-21C 4' PDH GR	1380	24-23C 6' PDH GR	20-80 4' PDH GRA	20-81 6' PDH GRA	1986	15" RCP	36'	CRUM CREEK
24-22C 6' PDH GR	1381	24-23C 6' PDH GR	20-81 6' PDH GRA	20-81 6' PDH GRA	1970	42" RCP	370'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
24-23C 6' SPEC	1382	24-24C 4' SPEC.	20-86 6' SPEC	20-87 4' SPEC	1970	15" RCP	34'	CRUM CREEK
24-24C 4' SPEC	1383	24-25C 6' SPEC.	20-87 4' SPEC	20-82 6' SPEC.	1970	18" RCP	178'	CRUM CREEK
24-25C 6' SPEC	1384	24-26C 6' SPEC	20-82 6' SPEC.	20-83 6' SPEC	1970	30" RCP	34'	CRUM CREEK
24-26C 6' SPEC.	1387	24-27C 6' PDH GR	20-83 6' SPEC.	20-84 6' PDH GRA	1970	30" RCP	117'	CRUM CREEK
25-11C 4' SPEC	1286	25-11C 4' GRATE	22-11C 4' SPEC	22-12C 4' GRATE		18" RCP	138'	CRUM CREEK
25-12C 4' GRATE	1287	25-12C 4' GRATE	22-12C 4' GRATE	22-13C 4' GRATE		18" RCP	128'	CRUM CREEK
25-13C 4' GRATE	2010	25-13C 4' GRATE	22-13C 4' GRATE	22-14C 4' GRATE		18" RCP	140'	CRUM CREEK
25-13C 4' GRATE	1288	25-13C 4' GRATE	22-14C 4' GRATE	22-15C 4' GRATE		18" RCP	82'	CRUM CREEK
25-14C 4' GRATE	1290	25-15C 4' GRATE	22-16C 4' GRATE	22-15C 4' GRATE		18" RCP	36'	CRUM CREEK
25-15C 4' GRATE	1291	25-16C 4' GRATE	22-15C 4' GRATE	22-9C 4' GRATE		18" RCP	36	CRUM CREEK
25-16C 4' GRATE	1292	25-17C	22-9C 4' GRATE	22-17C				CRUM CREEK
25-18C 4' CONC HD	1294	25-19C CONC HD	22-18C CONC HD	22-19C CONC HD		30" CMP		CRUM CREEK
25-1C 6' GRATE	1275	25-2C 6' GRATE	22-1C 6' GRATE	22-2C 6' GRATE	1959	18" RCP	60'	CRUM CREEK
25-20C END 12" CI	1295	25-21C TYPE C	22-20C END 12" CI	22-21C TYPE C	1986	12"-15" CIP to CM	204'	CRUM CREEK
25-21C TYPE C	1296	25-22C 4' GRATE	22-21C TYPE C	22-23C 4' GRATE	1986	15" CMP/PVT	116'	CRUM CREEK
25-22C 4' GRATE	1298	25-23C 4' GRATE	22-23C 4' GRATE	22-24C 4' GRATE	1986	24" CMP/PVT	132'	CRUM CREEK
25-23C 4' GRATE	1299	25-24C CONC HD	22-24C 4' GRATE	22-25C CONC HD	1986	24" CMP/PVT	32'	CRUM CREEK
25-25C 6' GRATE	1257	25-29C 6' GRATE	23-65C 6' GRATE	23-65C 6' GRATE	1958	18" RCP UD	274'	CRUM CREEK
25-26C 4' SPEC.	1253	25-2MC M.H.	23-68C 4' SPEC.	24-67C M.H.	1972	18" RCP	36'	CRUM CREEK
25-27C 6' GRATE	1259	25-28C M.H	23-66C 6' GRATE	23-67C M.H.	1972	18" RCP	22'	CRUM CREEK
25-28C M.H.	1260	25-29C 6' GRATE	23-67C M.H.	23-65C 6' GRATE	1958	18" RCP	82'	CRUM CREEK

FROM (NEW)	JD	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
25-29C 6' GRATE	1261	25-30C 6' GRATE	23-65C 6' GRATE	23-69C 6' GRATE	1958	18" RCP UD	276'	CRUM CREEK
25-2C 6' GRATE	1279	25-3C M H	22-2C 6' GRATE	22-3C M H	1958	24" RCP	260'	CRUM CREEK
25-30C 6' GRATE	1262	25-31C 6' GRATE	23-69C 6' GRATE	23-70C 6' GRATE	1958	18" RCP UD	169'	CRUM CREEK
25-31C 6' GRATE	1263	25-35C M H.	23-70C 6' GRATE	23-74C M H.	1958	24" RCP	32	CRUM CREEK
25-32C 6' GRATE	1264	25-33C 6' GRATE	23-71C 6' GRATE	23-73C 6' GRATE	1972	RCP	30'	CRUM CREEK
25-33C 6' GRATE	1265	25-34C 4' SPEC.	23-73C 6' GRATE	23-73C 4' SPEC.	1972	RCP	40'	CRUM CREEK
25-34C 4' SPEC.	1266	25-35C M H	23-73C 4' SPEC.	23-74C M H.	1972	RCP	28'	CRUM CREEK
25-35C M H	1267	25-36C 6' GRATE	23-74C M H.	23-75C 6' GRATE	1958	24" RCP UD	284'	CRUM CREEK
25-36C 6' GRATE	1277	25-2L 6' GRATE	23-75C 6' GRATE	22-2C 6' GRATE	1958	24" RCP UD	296'	CRUM CREEK
25-37C 4' SPEC.	1248	20-18C 6' GRATE	23-54C 4' SPEC	23-53C 6' GRATE	1972	14" RCP/PVT	57'	CRUM CREEK
25-38C M H.	1293	25-18C CONC HD	23-76C M.H	22-18C CONC HD		30"/24" CMP	290-92'	CRUM CREEK
25-39C 6' GRATE	1234	25-40C 4' SPEC IN	23-41C 6' GRATE	23-42C 4' SPEC IN	1958	18" RCP	112'	CRUM CREEK
25-40C 4' SPEC IN	1235	25-42C 4' SPEC IN	23-42C 4' SPEC.	23-44C 4' SPEC IN	1958	18" RCP	112'	CRUM CREEK
25-41C 6' GRATE	1236	25-42C 4' SPEC IN	23-43C 4' GRATE	23-44C 4' SPEC IN	1958	18" RCP	24'	CRUM CREEK
25-42C 4' SPEC IN	1237	25-43C M.H	23-44C 4' SPEC IN	23-59C M.H.	1958	18" RCP	68'	CRUM CREEK
25-43C M H	1238	25-44C 4' SPEC	23-59C M H	23-48C 4' SPEC	1972	36" RCP	16'	CRUM CREEK
25-44C 4' SPEC	1239	20-6C 6' GRATE	23-60C 4' SPEC	23-45C 6' GRATE	1972	36" RCP/PVT	180'	CRUM CREEK
25-4C CONC. HD	1280	25-3C M.H	22-4C CONC. HD	22-3C M.H	1959	24" RCP	128	CRUM CREEK
25-5C 4' SPEC.	1281	25-6C 4' GRATE	22-5C 4' SPEC	22-6C 4' GRATE		18" RCP	140'	CRUM CREEK
25-6C 4' GRATE	1282	25-7C 4' SPEC	22-6C 4' GRATE	22-7C 4' SPEC		18" RCP	136'	CRUM CREEK
25-7C 4' SPEC.	1291	25-8C 4' SPEC.	22-7C 4' SPEC	22-8L 4' SPEC.		18" RCP	144'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
25-8C 4' SPEC.	1284	25-16C 4' SPEC.	22-8C 4' SPEC.	22-9C 4' SPEC		18" RCP	88'	CRUM CREEK
25-9C 4' SPEC.	1285	25-16C 4' SPEC	22-9C 4' SPEC.	22-9C 4' SPEC		18" RCP	26'	CRUM CREEK
26-10C 4' GRATE	1194	26-11C 4' GRATE	24-110C 4' GRATE	24-111C 4' GRATE	1985	36" RCP/PVT	132	CRUM CREEK
26-11C 4' GRATE	1195	26-12C 6' GRATE	24-115C 4' GRATE	24-116C 4' GRATE	1985	36" RCP/PVT	355	CRUM CREEK
26-12C 6' GRATE	1197	26-13C CONC HD	24-116C 6' GRATE	24-117 CONC HD	1985	36" RCP/PVT	75'	CRUM CREEK
26-14C 4' SPEC	1182	26-15C 4' SPEC	24-101C 4' SPEC	24-105C 4' SPEC	1985	18" RCP	120'	CRUM CREEK
26-15C 4' SPEC	1183	26-16C CONC HD	24-105C 4' SPEC	24-102C CONC HD	1985	18" RCP	37'	CRUM CREEK
26-17C	2011	26-18 HDW	24-102C	24-104C HDW		42" CMP		CRUM CREEK
26-19C 2' GRATE I	1180	26-20C 4' SPEC	24-98C 2' GRATE I	24-99C 4' SPEC		12"C URB. LP.	21'	CRUM CREEK
26-20C 4' SPEC	1181	26-21C CONC HD	24-98C 4' SPEC	24-100C CONC HD	1986	15" RCP	180'	CRUM CREEK
26-22C CONC HD	1179	26-23C CONC HD	24-96C CONC HD	24-97C CONC HD	1981	24" RCP	56'	CRUM CREEK
26-23C 4' SPEC.	1171	26-25C 4' SPEC.	24-83C 4' SPEC	24-84C 4' SPEC.	1980	18" RCP	44'	CRUM CREEK
26-23C 4' SPEC.	1172	26-26C 4' GRATE	24-84C 4' SPEC.	24-89C 4' GRATE	1980	18" RCP	126	CRUM CREEK
26-26C 4' GRATE	1173	26-27C 4' SPEC.	24-89C 4' SPEC	24-90L 4' SPEC.	1980	18" RCP	6	CRUM CREEK
26-27C 4' SPEC.	1174	26-30C 4' SPEC.	24-89C 4' SPEC.	24-91C 4' SPEC	1980	18" RCP	216'	CRUM CREEK
26-28C 4' SPEC	5165	26-29C 4' SPEC	24-92C 4' SPEC.	24-93C 4' SPEC	1980	18" RCP	33'	CRUM CREEK
26-29C 4' SPEC	1176	26-30C 4' SPEC	24-93C 4' SPEC	24-91C 4' SPEC	1980	18" RCP	86'	CRUM CREEK
26-2C 4' GRATE	1231	26-3C CONN TO 3	23-37C 4' GRATE	22-38C CONN TO	1958	15" RCP	16'	CRUM CREEK
26-30C 4' SPEC.	1177	26-31C 2-6' SPEC. I	24-91C 4' SPEC	24-94C 2-6' SPEC. I	1980	21" RCP	230'	CRUM CREEK
26-31C 2-6' SPEC. I	1178	26-32C CONC HD	24-94C 2-6' SPEC. I	24-95C CONC HD	1980	18" 4-RCP	22	CRUM CREEK
26-4C 6' GRATE	1232	26-5C M.H.	23-39C 6' GRATE	23-39C M.H.	1958	30" RCP/DIP	307'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
26-5C 4' SPEC	1189	26-6C 4' SPEC.	24-114C 4' SPEC.	24-115C 4' SPEC	1985	18" RCP	93'	CRUM CREEK
26-6C 4' SPEC.	1190	26-7C 4' GRATE	24-115C 4' SPEC	24-117C 4' GRATE	1985	18" RCP	40'	CRUM CREEK
26-7C 4' GRATE	1191	26-8C 4' SPEC.	24-117C 4' GRATE	24-109C 4' SPEC	1985	20" RCP	52'	CRUM CREEK
26-9C 4' SPEC.	1192	26-10C 4' GRATE	24-108C 4' SPEC.	24-110C 4' GRATE	1985	18" RCP/PVT	60'	CRUM CREEK
27-12C TYPE C IN	1109	27-13C TYPE M IN	24-13C TYPE C IN	24-16C TYPE M IN	1992	18" RCP	19'	CRUM CREEK
27-11C TYPE M IN	1110	27-12C END WAL	24-16C TYPE M IN	24-17C END WAL	1992	18" RCP	32'	CRUM CREEK
27-13C BEGIN 8x3	1126	27-14C BEGIN 2x6	24-37C BEGIN 8x3	24-38C BEGIN 2'x6	1972	8'x3' STONE MAS	720'	CRUM CREEK
27-15C CONC HD	1112	27-19C END BOX	24-18C CONC HD	24-23C END BOX	1951	2'-6'x4' CONC BOX	215'	CRUM CREEK
27-16C 2- 2'x3' CR	1116	27-17C 2-2'x3' GRA	24-24C 2- 2'x3' GR	24-25C 2-2'x3' GRA	1951			CRUM CREEK
27-19C BEGIN 10'x	1127	27-20C Begin 14'x5	24-27C BEGIN 10'x	24-29C Begin 14'x5'	1964	10'x32' Rip-Rap Tra	856'	CRUM CREEK
27-1C #1 OM INLE	1124	27-2C 24 OM IN	24-35C 24 OM INL	24-36C 24 OM IN	1952	18" RCP	27'	CRUM CREEK
27-20C #1 OM INL	1129	27-21C #1 OM INL	24-40C #1 OM INL	24-41C #1 OM INL	1952	12" RCP	28'	CRUM CREEK
27-21C #1 OM INL	1130	27-23C 24 OM IN	24-41C #1 OM INL	24-42C 24 OM IN	1952	24" RCP	230'	CRUM CREEK
27-22C #1 OM INL	1128	27-23C 24 OM IN	24-44C #1 OM INL	24-42C 24 OM IN	1952	18" RCP	150'	CRUM CREEK
27-23C 24 OM IN	1131	27-24C 24 OM IN	24-42 24 OM INL	24-43C 24" OM IN	1952	36" RCP	28'	CRUM CREEK
27-24C 24 OM IN	1132	27-25C END 36" R	24-42C 24 OM IN	24-45C END 36" R	1952	36" RCP	280'	CRUM CREEK
27-27C 4' SPEC.	1135	27-28C 4' SPEC.	24-70C 4' SPEC.	24-71C 4' SPEC.	1957	15" RCP	40'	CRUM CREEK
27-28C 4' SPEC	1136	27-29C 4' SPEC.	24-71C 4' SPEC	24-72C 4' SPLC.	1957	18" RCP	80'	CRUM CREEK
27-29C 4' SPEC	1137	27-32C 4' SPEC	24-72C 4' SPEC	24-75C 4' SPEC	1957	24" RCP	110'	CRUM CREEK
27-2C 24 OM IN	1125	27-3C END 18" PIP	24-35C 24 OM IN	24-36C END 18" PI	1952	18" RCP	160'	CRUM CREEK
27-30C 4' GRATE	1138	27-31C 4' GRATE	24-74C 4' GRATE	24-75C 4' GRATE	1957	18" RCP	108'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
27-31C 4' GRATE	1139	27-32C 4' SPEC.	24-75C 4' GRATE	24-74C 4' SPEC.	1957	15" RCP	95'	CRUM CREEK
27-32C 4' SPEC	1140	27-33C 4' SPEC	24-75C 4' SPEC.	24-76C 4' SPEC.	1957	27" RCP	51'	CRUM CREEK
27-33C 4' SPEC	1141	27-34C 4' SPEC	24-76C 4' SPEC	24-66C 4' SPEC	1957	27" RCP	50'	CRUM CREEK
27-34C 4' SPEC	1142	27-37C 6' GRATE	24-69C 4' SPEC	24-67C 6' GRATE	1957	15" RCP	68'	CRUM CREEK
27-36C 4' PDH SPE	1154	27-37C 6' GRATE	24-48C 4' PDH SPE	24-47C 6' GRATE	1980	18" RCP	66'	CRUM CREEK
27-37C 6' GRATE	1143	27-38C JUNCT. BO	24-43C 6' GRATE	24-49C JUNCT. BO	1980	30" RCP	205'	CRUM CREEK
27-38C JUNCT. BO	1144	27-39C M.H.	24-49C JUNCT. BO	24-50C M.H.	1980	30" RCP	105'	CRUM CREEK
27-39C M.H.	1145	27-40C CONC HD	24-50C M.H.	24-51C CONC HD	1980	30" RCP	10'	CRUM CREEK
27-40C CONC HD	1146	27-41C CONC HD	24-51C CONC HD	24-52C CONC HD		4'CREEK	165'	CRUM CREEK
27-41C CONC HD	1147	27-42C M.H.	24-52C CONC HD	24-53C M.H.	1980	36" RCP	10'	CRUM CREEK
27-42C M.H.	1148	27-43C 4' GRATE	24-53C M.H.	24-54C 4' GRATE	1980	36" RCP	120'	CRUM CREEK
27-43C 4' GRATE	1149	27-44C M.H.	24-54C 4' GRATE	24-55C M.H.	1980	36" RCP	94'	CRUM CREEK
27-44C M.H.	1150	27-45C 4' SPEC	24-55C M.H.	24-56C 4' SPEC	1980	36" RCP	87'	CRUM CREEK
27-46C 4' GRATE	1153	27-47C 4' SPEC	24-59C 4' GRATE	24-60C 4' SPEC.	1980	36" RCP	203'	CRUM CREEK
27-47C 4' SPEC.	1164	27-48C 4' SPEC	24-60C 4' SPEC	24-61C 4' SPEC	1980	18" RCP	40'	CRUM CREEK
27-48C 4' SPEC	1155	27-49C 4' SPEC.	24-61C 4' SPEC	24-62C 4' SPEC.	1980	18" RCP	46'	CRUM CREEK
27-49C 4' SPEC	1156	27-50C 4' SPEC.	24-62C 4' SPEC.	24-63C 4' SPEC	1980	18" RCP	28'	CRUM CREEK
27-4C TYPE C INL	1203	27-7C TYPE M INL	24-9C TYPE C INL	24-10C TYPE M IN	1992	18" RCP	92'	CRUM CREEK
27-50C 4' SPEC.	1157	27-51C 4' SPEC.	24-63C 4' SPEC	24-64C 4' SPEC	1980	21" RCP	186'	CRUM CREEK
27-51C 4' SPEC.	1158	27-52C M.H.	24-64C 4' SPEC	24-65C M.H.	1980	21" RCP	64'	CRUM CREEK
27-52C 4' SPEC	1159	27-53C M.H.	24-66C 4' SPEC	24-65C M.H.	1980	18" RCP	60'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
27-63C M.H.	1160	27-65C 4' SPEC	24-65C M.H.	24-63C 4' SPEC	1980	24" RCP	299'	CRUM CREEK
27-55C 4' SPEC.	1162	27-56C 6' SPEC	24-67C 4' SPEC	24-57C 6' SPEC	1980	24" RCP	206'	CRUM CREEK
27-56C 4' SPEC.	1161	27-57C 4' SPEC.	24-68C 4' SPEC.	24-67C 4' SPEC.	1980	18" RCP	32'	CRUM CREEK
27-96C 6' SPEC.	1152	27-57C CONC HD	24-56C 6' SPEC.	24-58C CONC HD	1980	36" RCP	78'	CRUM CREEK
27-58C 6' GRATE	1163	27-59C 6' GRATE	24-77C 6' GRATE	24-78C 6' GRATE	1980	18" RCP	94'	CRUM CREEK
27-59C 6' GRATE	1164	27-61C 4' SPEC.	24-78C 6' GRATE	24-80C 4' SPEC.	1980	18" RCP	238'	CRUM CREEK
27-5C TYPE C INL	1104	27-6C TYPE C INL	24-11C TYPE C IN	24-12C TYPE C IN	1992	18" RCP	88'	CRUM CREEK
27-60C 4' SPEC	1165	27-61C 4' SPEC	24-79C 4' SPEC	24-80C 4' SPEC	1980	15" RCP	32'	CRUM CREEK
27-61C 4' SPEC	1166	27-63C 4' SPEC	24-80C 4' SPEC	24-81C 4' SPEC	1980	15" RCP	215'	CRUM CREEK
27-64C 4' SPEC.	1167	27-62C 4' SPEC	24-82C 4' SPEC.	24-84C 4' SPEC.	1980	15" RCP	33'	CRUM CREEK
27-63C 4' SPEC.	1168	27-64C CONC HD	24-83C 4' SPEC	24-85C CONC HD	1980	18" RCP	112'	CRUM CREEK
27-65C 4' SPEC	1169	27-66C 4' SPEC	24-84C 4' SPEC.	24-86C 4' SPEC	1980	18" RCP	40'	CRUM CREEK
27-66C 4' SPEC.	1170	27-67C CONC HD	24-85C 4' SPEC.	24-86C CONC HD	1980	18" RCP	50'	CRUM CREEK
27-68C END OPEN	1033	27-69C END 12" R	26-5C END OPEN	26-6C END 12" RC	1961	10'w-3h x12" deep	300'	CRUM CREEK
27-69C END 12" R	1038	27-73C #1 OM & G	26-6C END 12" RC	26-4C #1 OM & GR	1963	12" RCP	105'	CRUM CREEK
27-6C TYPE C INL	1105	27-7C TYPE M INL	24-13C TYPE C IN	24-10C TYPE M IN	1992	18" RCP	56'	CRUM CREEK
27-70C TYPE C IN	1074	27-71C M.H.	26-1C TYPE C INL	26-2 C M.H.	1993	8" CMP	8'	CRUM CREEK
27-71C M.H.	1075	27-72C #2 OM & G	26-2C M.H.	26-3C #2 OM & GR		8" CMP	50'	CRUM CREEK
27-72C #2 OM & G	1076	27-73C #1 OM & G	26-3C #2 OM & GR	26-4C #1 OM & GR		8" RCP	157'	CRUM CREEK
27-73C #1 OM & G	1079	27-76C #1 OM & G	26-4C #1 OM & GR	26-8C #1 OM & GR	1961	12" RCP	138'	CRUM CREEK
27-74C #2 OM	1083	27-75C #2 OM	26-13C #3 OM	26-7C #2 OM	1987	12" CTP	32'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
27-25C #2 OM	1083	27-26C #1 OM & G	26-7C #2 OM	26-8C #1 OM & GR	1997	12" 2-12" CORR I	45'	CRUM CREEK
27-26C #1 OM & G	1084	27-27C 6' SPEC	26-8C #1 OM & GR	26-9C 6' SPEC.	1960	21" RC PIPE	30'	CRUM CREEK
27-27C 6' SPEC	1085	29-2C STONE HD	26-9 6' SPEC.	26-10 STONE HD	1960	21" RCP	167'	CRUM CREEK
27-28C TYPE M IN I	1086	27-10C TYPE C IN	24-10C TYPE M IN	24-12C TYPE C IN	1992	18" RCP	36'	CRUM CREEK
27-8C TYPE C INL	1103	27-9C TYPE C INL	24-14C TYPE C IN	24-15C TYPE C IN	1992	18" RCP	38'	CRUM CREEK
27-9C TYPE C INL	1104	27-10C TYPE C IN	24-15C TYPE C IN	24-13C TYPE C IN	1992	18" RCP	98'	CRUM CREEK
29-1C CONC HD	1058	29-4C STONE HD	26-54C CONC. HD	26-55C STONE HD	1952	2-42" RCP	164'	CRUM CREEK
29-2C #1 OM & GR	1060	CONN TO 42" RC	26-57C #1 OM & G	CONN. TO 42" RC	1952	15" RCP	30'	CRUM CREEK
29-4C #1 OM & GR	1059	CONN TO 42" RC	26-56C #1 OM & G	CONN. TO 42" RC	1952	15" RCP	20'	CRUM CREEK
29-5C 6' SPEC	1057	29-6C STONE HD	26-52C 6' SPEC	26-53C STONE HD	1958	18" RCP	146'	CRUM CREEK
30-10C 12" PVC C	1091	30-12C 4" GRATE	26-20C 12" PVC C	26-21C 4" GRATE	1997	8" POLY ETHYLE	120'	CRUM CREEK
30-11C 12" PVC C	1090	30-12C 4" GRATE	26-22C 12" PVC C	26-21C 4" GRATE	1997	8" POLY ETHELE	120'	CRUM CREEK
30-12C 4" GRATE	1092	30-13C 4" TYPE C	26-21C 4" GRATE	26-23C 4" TYPE C	1997	18" CMP	134'	CRUM CREEK
30-13C 4" TYPE C	1093	30-15C "T" CONN.	26-23C 4" TYPE C	26-19C "T" CONN.	1997	18" CMP	30'	CRUM CREEK
30-14C METAL TL	1089	30-15C METAL TL	26-25C METAL TL	26-24C METAL TL	1997	66" CMP	260'	CRUM CREEK
30-16C 2 TYPE C	1094	30-17C "T" CONN.	26-25C 2 TYPE C	26-24L "T" CONN	1997	18" CMP	53'	CRUM CREEK
30-19C 12" PVC C	1095	30-20C 12" PVC C	26-26C 12" PVC C	26-27C 12" PVC C	1997	8" POLY ETHELE	80'	CRUM CREEK
30-1C #2 OM	1080	30-2C #3 OM	26-11C #2 OM	26-12C #2 OM	1937	12" RCP	20'	CRUM CREEK
30-20C 12" PVC C	1096	26-21C END 8" PO	26-27C 12" PVC C	26-28C END 8" PO	1997	8" POLY ETHELE	30'	CRUM CREEK
30-22C 12" PVC C	1061	30-23C 12" PVC C	26-30C 12" PVC C	26-31C 12" PVC C	1997	8" POLY ETHYLE	360'	CRUM CREEK
30-23C 12" PVC C	1062	30-24C 4" TYPE C	26-23C 12" PVC C	26-33C 4" TYPE C	1997	8" POLY ETHYLE	110'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
30-24C 4' TYPE C	1063	30-25C 4' TYPE C	26-32C 4' TYPE C	26-33C 4' TYPE C	1997	18" CMP	50'	CRUM CREEK
30-25C 4' TYPE C	1064	30-26C CONC HD	26-33C 4' TYPE C	26-34C CONC HD	1997	18" CMP	20'	CRUM CREEK
31-25C CONC HD	1065	30-27C & 30-34C 4'	26-33C CONC HD	26-41C & 26-44C	1997	46"x36" 2-CMPS	230'	CRUM CREEK
30-26C 4' TYPE C	1066	30-27C M.H.	26-36C 4' TYPE C	26-39C M.H.	1997	18" CMP	70'	CRUM CREEK
30-29C 4' TYPE C	1067	30-27C M.H.	26-37C 4' TYPE C	26-39C M.H.	1997	18" CMP	15'	CRUM CREEK
30-27C #2 OM	1057	27-74C #2 OM	26-37C #2 OM	26-35C #2 OM	1957	12" TCP	277'	CRUM CREEK
30-30C 4' TYPE C	1068	30-31C M.H.	26-38C 4' TYPE C	26-39C M.H.		12" CMP	78'	CRUM CREEK
30-31C M.H.	1069	30-32C 4' TYPE C	26-39C M.H.	26-40C 4' TYPE C	1997	18" CMP	25'	CRUM CREEK
30-34C #1 OM	1070	30-35C M.H.	26-44C #1 OM	26-45C M.H.	1964	48" RCP	170'	CRUM CREEK
30-35C M.H.	1071	30-36C STONE HD	26-45C M.H.	26-46C STONE HD	1964	48" RCP	46'	CRUM CREEK
30-36C STONE HD	1072	30-37C CONC HD	26-46C STONE HD	26-47C CONC HD		CREEK	136'	CRUM CREEK
30-37C CONC HD	1054	30-41C CONC HD	26-47C CONC HD	26-51C CONC HD	1998	24" CMP	91'	CRUM CREEK
30-38C 4' TYPE C	1055	30-39C 4' TYPE C	26-48C 4' TYPE C	26-49C 4' TYPE C	1998	18" PEP	50'	CRUM CREEK
30-39C 4' TYPE C	1056	30-40C JUNCT 42"	26-48C 4' TYPE C	26-50C JUNCT 42"	1998	18" PEP	65'	CRUM CREEK
30-40C CONC HDW	1086	30-50C STONE HD	26-14C CONC HD	26-15C STONE HD	1994	30"x48" CMP	27'	CRUM CREEK
30-6C END 8' CM	1087	30-7C END 8' CM	26-42C END 8' C	26-43C END 8' C	1994	ST CMP	55'	CRUM CREEK
30-8C CONC HDW	1089	31-9C CONC HDW	26-14C CONC HD	26-13C CONC HD	1994	18" CMP	32'	CRUM CREEK
31-13C 4' TYPE C	1042	31-11C 4' TYPE C	27-13C 4' TYPE C	27-14C 4' TYPE C	1990	18" RC UD	165'	CRUM CREEK
31-11C 4' TYPE C	1044	31-12C 4' TYPE C	27-14C 4' TYPE C	27-16C 4' TYPE C	1990	21" RC UD	163'	CRUM CREEK
31-12C 4' TYPE C	1048	31-13C 4' TYPE C	27-16C 4' TYPE C	27-20C 4' TYPE C	1990	24" RCP	80'	CRUM CREEK
31-12C 4' TYPE C	1049	31-14C 4' TYPE M	27-20C 4' TYPE C	27-21C 4' TYPE M	1990	24" RCP	166'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
31-15C 4' TYPE M	1050	31-16C 4' TYPE M	27-12C 4' TYPE M	27-13C 4' TYPE M	1990	18" RCP	66'	CRUM CREEK
31-16C 4' TYPE M	1051	31-17C 4' TYPE M	27-23C 4' TYPE M	27-24C 4' TYPE M	1990	18" RCP	39'	CRUM CREEK
31-17C 4' TYPE M	1052	31-18C 4' TYPE M	27-24C 4' TYPE M	27-25C 4' TYPE M	1990	18" RCP	30'	CRUM CREEK
31-18C 4' TYPE M	1053	31-19C END 24" (P	27-25C 4' TYPE M	27-26C END 24" (P	1990	24" RCP	18'	CRUM CREEK
31-1C 4' SPEC	1031	31-2C 4' SPEC	27-1C 4' SPEC.	27-2C 4' SPEC	1961	18" RCP	34'	CRUM CREEK
31-2C 4' SPEC.	1032	31-3C 4' SPEC.	27-2C 4' SPEC	27-4C 4' SPEC.	1961	18" RC UD	280'	CRUM CREEK
31-3C 4' SPEC.	1033	31-4C 4' SPEC.	27-3C 4' SPEC.	27-4C 4' SPEC.	1961	18" RCP	42'	CRUM CREEK
31-4C 4' SPEC.	1034	31-6C M H.	27-4C 4' SPEC.	27-5C M H	1961	18" RCP	93'	CRUM CREEK
31-5C 4' GRATE	1035	31-6C M H	27-6C 4' GRATE	27-5C M H.		18" RCP	109'	CRUM CREEK
31-7C 4' TYPE C	1045	31-8C 4' TYPE C	27-17C 4' TYPE C	27-18C 4' TYPE C	1990	18" RC UD	220'	CRUM CREEK
31-8C 4' TYPE C	1046	31-9C 4' TYPE C	27-18C 4' TYPE C	27-19C 4' TYPE C	1990	18" RC UD	160'	CRUM CREEK
31-9C 4' TYPE C	1047	31-12C 4' TYPE C	27-19C 4' TYPE C	27-16C 4' TYPE C	1990	18" RCP	29'	CRUM CREEK
32-1C 4' SPEC.	1036	32-2C 4' SPEC.	27-7C 4' SPEC	27-8C 4' SPEC	1961	18" RCP	34'	CRUM CREEK
7-(MARPLE TWP)	1691	13-2C 4' TYPE M	7-14 4' TYPE M	12-54 4' TYPE M	1990	24" or 30" RCP	400'	CRUM CREEK
8-10C 4' SPEC.	255	8-11C 4' SPEC.	7-19 C 4' SPEC.	7-22 C 4' SPEC	1977	18" RC UD	218'	CRUM CREEK
8-11C 4' SPEC	256	8-12C 4' SPEC.	7-22 C 4' SPEC	7-23 C 4' SPEC	1977	18" CMP	96'	CRUM CREEK
8-12C 4' SPEC	1665	14-17C 4' SPEC	7-24 4' SPEC	12-38 4' SPEC	1977	24" RCP	224'	CRUM CREEK
8-13C 4' SPEC.	268	8-14C 4' SPEC	7-1 C 4' SPEC	7-2 C 4' SPEC	1977	22"x13" CMP	35'	CRUM CREEK
8-14C 4' SPEC.	292	8-39C 4' SPEC	7-2 C 4' SPEC	7-106 C 4' SPEC.	1977	18"RC UD	200'	CRUM CREEK
8-15C GRATE INL	237	8-16C GRATE INL	7-5 C GRATE INLE	7-6 C GRATE INLE	1953	18" RCP	34'	CRUM CREEK
8-16C GRATE INL	272	8-17C 91 OM	7-6 C GRATE INLE	7-7C 61 OM	1953	18" RCP	187'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
8-17C 41 OM	273	8-18C 41 OM	7-7 C 41 OM	7-8 C 41 OM	1953	24" RCP	34'	CRUM CREEK
8-19C 41 OM	274	8-19C M H	7-8 C 41 OM	7-9 C M.H.	1953	24" RCP	198'	CRUM CREEK
8-1C 4' SPEC.	276	8-7C 4' SPEC.	7-12 C 4' SPEC.	7-13 C 4' SPEC	1977	18" RC DD	200'	CRUM CREEK
8-20C 6' SPEC	269	8-21C 6' SPEC.	7-3 C 6' SPEC.	7-4 C 6' SPEC..	1964	18" RCP	35'	CRUM CREEK
8-21C 6' SPEC	347	8-84C 4' GRATE	7-4 C 6' SPEC	8-130 C 4' GRATE	1964	24" RCP	100'	CRUM CREEK
8-22C 4' SPEC	275	8-23C 4' SPEC	7-10 C 4' SPEC	7-11 C 4' SPEC	1961	15" RCP	110'	CRUM CREEK
8-23C 4' SPEC	1655	14-28C 4' SPEC	7-11 4' SPEC	12-26 4' SPEC	1964	18" RCP	130'	CRUM CREEK
8-24C TYPE J	317	8-25C TYPE J	8-175 C TYPE J	8-176 C TYPE J	1970	18" RCP	32'	CRUM CREEK
8-26C M.H.	318	8-27C M.H.	8-177 C M.H.	8-178 C M.H.	1960	12" RCP	253	CRUM CREEK
8-27C M.H	319	8-31C M.H.	8-178 C M.H	8-179 C M.H	1995	15" RCP	43'	CRUM CREEK
8-28C M.H.	321	8-31C M.H	8-180 C M.H	8-179 C M.H.	1960	30" CMP	68'	CRUM CREEK
8-29C TYPE C INL	320	Connect To 60" Hol	8-181 C TYPE C IN	Connect To 60" Hol	1995	24" CMP	33'	CRUM CREEK
8-2C 4' SPEC	277	8-4C M.H	7-13 C 4' SPEC	7-15 C M.H	1977	22"x13" CORR E.C.	58'	CRUM CREEK
8-30C Modified Ty	303	8-31C M.H.	8-182 C Modified T	8-179 C M.H.	1995	24" CMP	20'	CRUM CREEK
8-31C M.H.	304	8-32C TYPE M	8-179 C M.H.	8-183 C TYPE M.	1967	24" RCP	20'	CRUM CREEK
8-32C TYPE M	305	8-33C 4' GRATE	8-183 C TYPE M	8-184 C 4' GRATE	1967	24" RCP	230'	CRUM CREEK
8-34C 4' GRATE	340	8-41C 4' GRATE	8-151 C 4' GRATE	8-148 C 4' GRATE	1970	18" RCP	44'	CRUM CREEK
8-35C 4' SPEC.	331	8-36C 4' SPEC	8-167 C 4' SPEC	8-168 C 4' SPEC	1970	18" RCP	210'	CRUM CREEK
8-36C 4' SPEC	332	8-37C 4' SPEC.	8-168 C 4' SPEC.	8-169 C 4' SPEC.	1970	18" RCP	291	CRUM CREEK
8-37C 4' SPEC	333	8-38C M H	8-169 C 4' SPEC.	8-165 C M H.	1970	18" RCP	190'	CRUM CREEK
8-38C 4' INLET	334	8-40C M.H.	8-165 C 4' INLET	8-162 C M H	1970	18" RCP	33'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
8-39C 4' INLET	327	8-40C M.H.	8-164 C 4' INLET	8-162 C M H	1970	18" RCP	34'	CRUM CREEK
8-37C 4' SPEC.	278	8-40C M H.	7-14 C 4' SPEC.	7-15 C M.H.	1977	18" RC UD	50'	CRUM CREEK
8-40C M H	328	8-45C M H	8-162 C M H.	8-160 C M H.	1970	30" RCP	550'	CRUM CREEK
8-41C 4' INLET	345	8-42C M H	8-197 C 4' INLET	8-196 C M H	1970	18" RCP	33'	CRUM CREEK
8-42C M H	346	8-43C 4' SPEC	8-196 C M H.	8-158 C 4' SPEC	1970	21" RC UD	334'	CRUM CREEK
8-43C 4' SPEC	323	8-44C 4' SPEC	8-158 C 4' SPEC	8-159 C 4' SPEC	1970	24" RC UD	359'	CRUM CREEK
8-44C 4' SPEC.	324	8-45C M H	8-159 C 4' SPEC	8-160 C M.H.	1970	24" RCP	56'	CRUM CREEK
8-45C M H.	329	8-46C 4' INLET	8-160 C M H	8-161 C 4' INLET	1970	30" RCP	37'	CRUM CREEK
8-46C 4' INLET	330	8-53C M.H.	8-161 C 4' INLET	8-165 C M H.	1970	30" RCP	105'	CRUM CREEK
8-47C 4' SPEC	334	8-53C M H	8-166 C 4' SPEC	8-165 C M H.	1970	24" RCP	42'	CRUM CREEK
8-48C 4' SPEC.	312	8-49C 4' SPEC.	8-170 C 4' SPEC	8-171 C 4' SPEC	1970	18" RCP	45'	CRUM CREEK
8-49C 4' SPEC	313	8-50C TYPE I	8-171 C 4' SPEC	8-172 C TYPE J	1970	18" RCP	33'	CRUM CREEK
8-4C M.H.	279	8-5C 4' SPEC.	7-15 C M.H.	7-16C 4' SPEC	1977	18" RC UD	224'	CRUM CREEK
8-50C TYPE I	314	8-51C TYPE J	8-172 C TYPE I	8-173 C TYPE J	1970	18" RCP	44'	CRUM CREEK
8-51C TYPE J	315	8-52C TYPE J	8-173 C TYPE J	8-174 C TYPE J	1970	18" RCP	34'	CRUM CREEK
8-52C TYPE J	316	8-53C M H	8-174 C TYPE I	8-165 C M H.	1970	18" RCP	22'	CRUM CREEK
8-53C M H.	311	MARPLE TWP 4'	8-165 C M H.	MARPLE TWP 4'	1970	36" RCP	170'	CRUM CREEK
8-54C #1 OM	306	8-55C 2- GRATE I	8-185 C #1 OM	8-186 C 2- GRATE	1953	15" RCP	65'	CRUM CREEK
8-55C 2- GRATE I	270	8-17C #1 OM	8-186 C 2- GRATE I	7-2 C #1 OM	1952	18" RCP	292'	CRUM CREEK
8-56C 2-6' GRATE	449	8-57C 2-6' GRATE	8-22 C 2-6' GRATE	8-21 C 2-6' GRATE	1957	18" RCP	320'	CRUM CREEK
8-57C 2-6' GRATE	450	9-83C 2-6' GRATE	8-21 C 2-6' GRATE	8-20 C 2-6' GRATE	1957	21" RCP	224'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
8-58C 4' SPEC	393	8-59C 4' SPEC	8-107 C 4' SPEC.	8-106 C 4' SPEC	1977	22"x13" CMP	35'	CRUM CREEK
8-59C 4' SPEC.	394	8-61C M H	8-106 C 4' SPEC	8-108 C M H	1977	18" RC UD	230'	CRUM CREEK
8-61C 4' SPEC.	250	8-60C 4' SPEC.	7-16 C 4' SPEC	7-17 C 4' SPEC.	1977	21" RC UD	248'	CRUM CREEK
8-60C 4' SPEC	371	8-61C M H	8-109C 4' SPEC.	8-108 C M H	1977	22"x13" CMP	26'	CRUM CREEK
8-61C M.H	372	8-63C 4' SPEC	8-106 C M H.	8-110 C 4' SPEC.	1977	18" RC UD	180'	CRUM CREEK
8-62C 4' SPEC	373	8-63C 4' SPEC	8-111 C 4' SPEC.	8-110 C 4' SPEC	1977	22"x13" CMP	37'	CRUM CREEK
8-63C 4' SPEC	374	8-65C 4' SPEC	8-110 C 4' SPEC.	8-112 C 4' SPEC	1977	18" RC UD	220'	CRUM CREEK
8-64C 4' SPEC	375	8-65C 4' SPEC	8-113 C 4' SPEC.	8-112 C 4' SPEC	1977	22"x13" CMP	47'	CRUM CREEK
8-65C 4' SPEC	376	8-66C 4' SPEC	8-112 C 4' SPEC	8-114 C 4' SPEC	1977	18" CMP	53'	CRUM CREEK
8-66C 4' SPEC.	377	8-71 M H	8-114 C 4' SPEC.	8-115 C M H	1950	18" RCP	32'	CRUM CREEK
8-67C TYPE M	379	8-69C TYPE M	8-119 C TYPE M	8-117 C TYPE M	1950		48'	CRUM CREEK
8-68C 4' SPEC.	378	8-69C TYPE M	8-118 C 4' SPEC	8-117 C TYPE M	1950	15" RCP	24'	CRUM CREEK
8-69C TYPE M	380	8-71 C M H.	8-117 C TYPE M	8-115 C M H	1950	22"x13" CPA	143'	CRUM CREEK
8-6C 4' SPEC	241	8-7C 4' SPEC.	7-17 C 4' SPEC	7-20 C 4' SPEC	1977	21" RC UD	228'	CRUM CREEK
8-70C 4' SPEC.	381	8-71C M H	8-116 C 4' SPEC.	8-115 C M H	1950	18" RCP	32'	CRUM CREEK
8-71 M.H.	382	8-122 C JUNCT 15"	8-115 C JUNCT 15"	8-122 C JUNCT 15"	1950	24" RCP	210'	CRUM CREEK
8-71C M.H.	361	8-78C TYPE M	8-115 C M H	8-124 C TYPE M	1950	24" RCP	395'	CRUM CREEK
8-72C 4' SPEC	360	8-74C JUNCT 24"	8-121 C 4' SPEC.	8-122 C JUNCT 24"	1950	15" RCP	34'	CRUM CREEK
8-73C TYPE M	359	8-74C JUNCT 24"	8-120 C TYPE M	8-122 C JUNCT 24"	1950	15" RCP	5'	CRUM CREEK
8-75C GRATE INL.	362	8-79C TYPE M	8-123 C GRATE IN	8-124 C TYPE M	1950	24" RCP	46'	CRUM CREEK
8-76C TYPE M	363	8-77C TYPE M	8-126 C TYPE M	8-127 C TYPE M	1950	18" RCP	28'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
8-77C TYPE M	364	8-78C TYPE M	8-124 C TYPE M	8-124 C TYPE M	1953	24" RCP	140'	CRUM CREEK
8-78C TYPE M	365	8-79C 4' SPEC	8-124 C TYPE M	8-125 C 4' SPEC	1958	24" RCP	15'	CRUM CREEK
8-79C 4' SPEC	282	8-80C 4' SPEC	7-20 C 4' SPEC	7-21 C 4' SPEC	1977	21" RCP CD	70'	CRUM CREEK
8-80C 4' SPEC	366	8-81C End 24" RCP	8-126 C 4' SPEC	8-155 C End 24" R	1953	24" RCP	65'	CRUM CREEK
8-81C BEGIN 78" S	367	8-82C STONE HD	8-153 C BEGIN 78"	8-129 C STONE H	1953	78" WIDE	200'	CRUM CREEK
8-82C STONE HD	368	8-83C 4' GRATE	8-129 C STONE H	8-130 C 4' GRATE	1953	24" RCP	70'	CRUM CREEK
8-83C 4' GRATE	369	8-84C 4' GRATE	8-132 C 4' GRATE	8-131 C 4' GRATE	1977	12" RCP CD	82'	CRUM CREEK
8-84C 4' GRATE	370	8-85C 4' GRATE	8-131 C 4' GRATE	8-130 C 4' GRATE	1977	12" RCP CD	350'	CRUM CREEK
8-85C 4' SPEC	283	8-12C 4' SPEC	7-21 C 4' SPEC	7-23 C 4' SPEC	1977	14"x23" CMP	43'	CRUM CREEK
8-86C 4' SPEC	284	8-10C 4' SPEC	7-19 C 4' SPEC	7-19 C 4' SPEC	1977	18" RCP CD	147'	CRUM CREEK
9-100C TYPE M 1	428	9-101C #10M & G	8-55 C TYPE M IN	8-49 C #10M & GR	1983	72" (OBRL HD)	284'	CRUM CREEK
9-101C #10M & G	429	9-104C #10M & G	8-49 C #10M & GR	8-52 C #10M & GR	1955	18" RCP	72'	CRUM CREEK
9-102C #10M & G	425	9-103C #10M & G	8-50 C #10M & GR	8-51 C #10M & GR	1955	18" RCP	42'	CRUM CREEK
9-103C #10M & G	426	9-104C #10M & G	8-51 C #10M & GR	8-52 C #10M & GR	1955	18" RCP	68'	CRUM CREEK
9-104C #10M & G	430	9-105C STONE HD	8-52 C #10M & GR	8-53 C STONE HD	1955	24" RCP	130'	CRUM CREEK
9-105C 2-6' SPEC	432	9-107C MH	8-24 C 2-6' SPEC	8-25 C MH	1957	15" RCP	24'	CRUM CREEK
9-107C MH	433	9-108C 2-#10M	8-25 C MH	8-32 C 2-#10M	1955	21" RCP	115'	CRUM CREEK
9-108C 2-#10M	434	9-110C #1 GRATE	8-32 C 2-#10M	8-33 C #1 GRATE	1955	21" RCP	50'	CRUM CREEK
9-109C #10M	435	9-110C #1 GRATE	8-34 C #10M	8-33 C #1 GRATE	1955	15" RCP	75'	CRUM CREEK
9-110C #1 GRATE	436	9-113C 2-#10M	8-33 C #1 GRATE	8-36 C 2-#10M	1955	24" RCP	195'	CRUM CREEK
9-111C 2-#10M	437	9-112C 2-#10M	8-35 C 2-#10M	8-36 C 2-#10M	1955	18" RCP	30'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
9-117C 2-#1 OM	420	9-118C JUNCT 45°	8-56 C 2-#1 OM	8-57 C JUNCT 45°	1955	30" RCP	140'	CRUM CREEK
9-114C STONE HD	407	9-115C STONE HD	8-56 C STONE HD	8-57 C STONE HD	1955	48" RCP	45'	CRUM CREEK
9-116C 2-#1 OM.	408	9-117C 2-#1 OM	8-58 C 2-#1 OM	8-59 C 2-#1 OM	1955	24" RCP	36'	CRUM CREEK
9-115C 2-#1 OM.	409	9-115C STONE HD	8-59 C 2-#1 OM.	8-60 C STONE HD	1955	24" RCP	150'	CRUM CREEK
9-120C 4' SPEC.	411	9-170C 4' SPEC.	8-63 C 4' SPEC	8-65 C 4' SPEC.	1959	15" RCP	32	CRUM CREEK
9-208C 4' SPEC	412	9-121C M H.	8-66 C 4' SPEC.	8-69 C M H	1959	18" RCP	119'	CRUM CREEK
9-121C M H	413	9-122C STONE HD	8-69 C M H	8-70 C STONE HD	1959	18" RCP	126'	CRUM CREEK
9-123C 4' SPEC	415	9-124C 4' SPEC.	8-73 C 6' SPEC	8-74 C 4' SPEC.	1926	18" RCP	55'	CRUM CREEK
9-124C 4' SPEC.	416	9-125C 4' SPEC.	8-74 C 4' SPEC.	8-75 C 4' SPEC	1956	21" RCP	50'	CRUM CREEK
9-125C 4' SPEC.	417	9-126C 4' SPEC.	8-75 C 4' SPEC	8-76 C 4' SPEC	1956	21" RCP	132'	CRUM CREEK
9-126C 4' SPEC	418	9-127C #10M & G	8-76 C 4' SPEC	8-77 C #10M & GR	1954	21" RCP	49'	CRUM CREEK
9-127C #10M & G	395	9-128C #10M & G	8-77 C #10M & GR	8-78 C #10M & GR	1954	24" RCP	15'	CRUM CREEK
9-129C #10M & G	396	9-131C #10M & G	8-78 C #10M & GR	8-79 C #10M & GR	1954	24" RCP	22'	CRUM CREEK
9-129C #10M & G	397	9-130C #10M & G	8-80 C #10M & GR	8-81 C #10M & GR	1954	18" RCP	65'	CRUM CREEK
9-130C #10M & G	398	9-131C #10M & G	8-81 C #10M & GR	8-79 C #10M & GR	1954	18" RCP	87'	CRUM CREEK
9-131C #10M & G	399	9-132C STONE HD	8-79 C #10M & GR	8-82 C STONE HD	1954	21" RCP	125'	CRUM CREEK
9-133C #10M & G	405	9-134C OM & GRA	8-90 C #10M & GR	8-86 C OM & GRA		12" RCP	28'	CRUM CREEK
9-134C OM & GRA	406	9-135C OM & GRA	8-86 C OM & GRA	8-87 C OM & GRA		12" RCP	120'	CRUM CREEK
9-135C OM & GRA	383	9-136C OM & GRA	8-87 C OM & GRA	8-88 C OM & GRA		12" RCP	25'	CRUM CREEK
9-136C OM & GRA	384	9-137C END 12" PI	8-88 C OM & GRA	8-90 C END 12" PI		12"		CRUM CREEK
9-138C #10M & G	401	9-129C #10M & G	8-93 C #10M & GR	8-91 C #10M & GR	1949	15" RCP	20'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
9-139C #IOM & G	402	9-140C #IOM & G	8-91 C #IOM & GR	8-92 C #IOM & GR	1969	18" RCP	34'	CRUM CREEK
9-140C #IOM & G	403	9-141C M. H.	8-92 C #IOM & GR	8-93 C M. H	1969	18" RCP	156	CRUM CREEK
9-141C M. H.	404	9-142C STONE HD	8-93 C M. H	8-94 C STONE HD	1969	20" RCP	600'	CRUM CREEK
9-142C STONE HD	388	9-144C #IOM & G	8-100 C STONE H	8-101 C #IOM & G	1952	54" RCP	29'	CRUM CREEK
9-144C #IOM & G	389	9-145C #IOM & G	8-101 C #IOM & G	8-102 C #IOM & G	1953	54" RCP	26'	CRUM CREEK
9-145C #IOM & G	390	9-146C STONE HD	8-102 C #IOM & G	8-200 C STONE H	1960	54" RCP	138'	CRUM CREEK
9-146C STONE HD	1772	15-12C MATCH #X	8-103 STONE HD	15-69A MATCH #'	1973	2'x3' Stone Masonry	366'	CRUM CREEK
9-147C 6' SPEC.	414	9-148C STONE HD	8-31 C 6' SPEC.	8-72 C STONE HD	1958	15" RCP	135	CRUM CREEK
9-149C #IOM & G	400	9-150C IOM & GRA	8-83 C #IOM & GR	8-84 C OM & GRA			56'	CRUM CREEK
9-151C OM & GRA	365	9-152C OM & GRA	8-95 C OM & GRA	8-96 C OM & GRA		12"		CRUM CREEK
9-1C 4' SPEC	137	9-2C 4' SPEC	3-68 C 4' SPEC	3-70 C 4' SPEC	1970	18" RCP	118'	CRUM CREEK
9-2C 4' GRATE	138	9-2C 4' SPEC.	3-69 C 4' GRATE	3-70 C 4' SPEC	1970	18" RCP	72'	CRUM CREEK
9-3C 4' SPEC	139	9-4C M.H	3-70 C 4' SPEC	3-71 C M.H	1970	24" RCP	153'	CRUM CREEK
9-41C 4' SPEC.	348	9-42C 4' SPEC.	8-131 C 4' SPEC.	8-134 C 4' SPEC	1970	18" RC UD	270'	CRUM CREEK
9-42C 4' SPEC.	349	9-44C 4' SPEC.	8-134 C 4' SPEC	8-136 C 4' SPEC.	1970	18" RC UD	231'	CRUM CREEK
9-43C 4' GRATE	360	CONN TO 15" RC	8-135 C 4' GRATE	CONN TO 15" RC		18" RCP	24'	CRUM CREEK
9-44C 4' SPEC	351	9-45C 4' SPEC	8-135 C 4' SPEC	8-137 C 4' SPEC.	1970	18" RC UD	228'	CRUM CREEK
9-45C 4' SPEC	352	9-46C TYPE 3	8-137 C 4' SPEC	8-138 C TYPE 3	1970	18" RCP	105'	CRUM CREEK
9-46C TYPE 3	353	9-47C 4' SPEC	8-138 C TYPE 3	8-139 C 4' SPEC	1970	18" RCP	58'	CRUM CREEK
9-47C 4' SPEC.	397	9-50C 4' SPEC.	8-139 C 4' SPEC	8-187 C 4' SPEC	1970	24" RCP	185'	CRUM CREEK
9-48C 4' GRATE	399	9-49C 4' SPEC	8-189 C 4' GRATE	8-188 C 4' SPEC	1970	18" RCP	54'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
9-49C 4' SPEC	210	9-50C 4' SPEC.	8-188 C 4' SPEC.	8-187 C 4' SPEC.	1970	18" RCP	36'	CRUM CREEK
9-50C 4' SPEC	136	9-51C 4' SPEC.	8-187 C 4' SPEC.	8-30 C 4' SPEC.	1970	24" RCP	222'	CRUM CREEK
9-51C 4' SPEC	342	9-52C TYPE I	8-153 C 4' SPEC	8-154 C TYPE I	1970	22"x13" CMP	68'	CRUM CREEK
9-52C TYPE I	343	8-42C M.H.	8-154 C TYPE I	8-126 C M.H	1970	18" RCP	64'	CRUM CREEK
9-53C TYPE J	344	8-42C M.H	8-155 C TYPE J	8-156 C M.H	1970	18" RCP	49'	CRUM CREEK
9-54C 4' GRATE	354	9-56C M.H	8-140 C 4' GRATE	8-142 C M.H.	1970	18" RCP	34'	CRUM CREEK
9-55C 4' GRATE	355	9-56C M.H	8-141 C 4' GRATE	8-142 C M.H	1970	18" RCP	34'	CRUM CREEK
9-56C M.H	356	9-59C M.H.	8-142 C M.H	8-144 C M.H	1970	18" RCP	290'	CRUM CREEK
9-57C 4' GRATE	357	9-59C M.H	8-144 C 4' GRATE	8-143 C M.H	1970	18" RCP	94'	CRUM CREEK
9-58C 4' GRATE	358	9-59C M.H.	8-145 C 4' GRATE	8-143 C M.H	1970	18" RCP	34'	CRUM CREEK
9-59C M.H	335	9-65C M.H	8-143 C M.H	8-146 C M.H	1970	18" RCP	292'	CRUM CREEK
9-60C 4' GRATE	336	9-61C 4' GRATE	8-149 C 4' GRATE	8-148 C 4' GRATE	1970	18" RCP	56'	CRUM CREEK
9-61C 4' GRATE	341	9-65C M.H.	8-148 C 4' GRATE	8-146 C M.H	1970	18" RCP	34'	CRUM CREEK
9-62C 4' GRATE	336	9-64C 4' GRATE	8-150 C 4' GRATE	8-147 C 4' GRATE	1970	18" RCP	55'	CRUM CREEK
9-63C 4' GRATE	337	9-64C 4' GRATE	8-152 C 4' GRATE	8-147 C 4' GRATE	1970	18" RCP	33'	CRUM CREEK
9-64C 4' GRATE	338	9-65C M.H	8-141 C 4' GRATE	8-146 C M.H.	1970	18" RCP	34'	CRUM CREEK
9-65C M.H	335	8-40C M.H.	8-146 C M.H	8-162 C M.H.	1970	30" RCP	274'	CRUM CREEK
9-66C 4' SPEC.	441	9-69C 4' SPEC.	8-41 C 4' SPEC.	8-40 C 4' SPEC.	1971	18" RCP UD	210'	CRUM CREEK
9-67C 4' SPEC	439	9-68C 4' SPEC.	8-38 C 4' SPEC	8-39 C 4' SPEC.	1971	18" RCP UD	402'	CRUM CREEK
9-68C 4' SPEC.	440	9-69C 4' SPEC.	8-39 C 4' SPEC	8-40 C 4' SPEC	1971	18" RCP UD	190'	CRUM CREEK
9-69C 4' SPEC	442	9-70C 4' SPEC.	8-40 C 4' SPEC	8-42 C 4' SPEC	1957	24" RCP	180'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
9-6C 4' GRATE	305		8-67 C 4' GRATE	8-139 C 4' GRATE	1970	15" RCP	43'	CRUM CREEK
9-70C 4' SPEC	419	9-71C 4' GRATE	8-43 C 4' SPEC.	8-43 C 4' GRATE	1957	24" RCP	132'	CRUM CREEK
9-71C 4' GRATE	420	9-72C 6' SPEC.	8-43 C 4' GRATE	8-44 6' SPEC.	1957	27" RCP	70'	CRUM CREEK
9-72C 6' SPEC.	421	9-73C M.H.	8-44 C 6' SPEC	8-45 C M.H	1957	27" RCP	32'	CRUM CREEK
9-73C M.H	422	9-74C 2-#1 OM	8-45 C M.H	8-46 C 2-#1 OM	1955	24" RCP	125'	CRUM CREEK
9-74C 2-#1 OM.	423	9-75C 2-#1 OM	8-46 C 2-#1 OM	8-47 C 2-#1 OM	1955	24" RCP	26'	CRUM CREEK
9-75C 2-#1 OM	424	9-76C STONE HD	8-47 C 2-#1 OM.	8-48 C STONE HD	1955	24" RCP	280'	CRUM CREEK
9-77C 2-6 GRATE	443	9-78C 6' GRATE	8-29 C 2-6' GRATE	8-28 C 6' GRATE	1957	21" RCP	342'	CRUM CREEK
9-78C 6' GRATE	444	9-80C 4' SPEC	8-28 C 6' GRATE	8-27 C 4' SPEC	1957	21" RCP	235'	CRUM CREEK
9-79C 6' SPEC.	445	9-80C 4' SPEC.	8-30 C 6' SPEC	8-27 C 4' SPEC.	1957	21" RCP	270'	CRUM CREEK
9-80C 4' SPEC.	446	9-81C M.H.	8-27 C 4' SPEC.	8-26 C M.H	1957	30" RCP	390'	CRUM CREEK
9-81C M.H	447	9-82C 4' SPEC.	8-25 C M.H	8-33 C 4' SPEC.	1957	30" RCP	350'	CRUM CREEK
9-82C 4' SPEC	448	9-84C M.H.	8-33 C 4' SPEC	8-19 C M.H	1957	30" RCP	328'	CRUM CREEK
9-83C 2-6' GRATE	451	9-84C M.H	8-20 C 2-6' GRATE	8-19 C M.H	1957	21" RCP	32'	CRUM CREEK
9-84C M.H.	452	9-85C M.H	8-19 C M.H	8-18 C M.H	1957	36" RCP	105'	CRUM CREEK
9-85C M.H	453	9-86C 4' GRATE	8-18 C M.H	8-17 C 4' GRATE	1957	30" RCP	148'	CRUM CREEK
9-86C 4' GRATE	454	9-87C M.H.	8-17 C 4' GRATE	8-31 C M.H.	1957	24" RCP	270'	CRUM CREEK
9-87C M.H	431	9-89C 6' SPEC	8-31C M.H.	8-32 C 6' SPEC.	1957	24" RCP	184'	CRUM CREEK
9-88C STONE HD	462	9-89C 6' SPEC	8-16 C STONE HD	8-15 C 6' SPEC.	1968	24" RCP	40'	CRUM CREEK
9-89C 6' SPEC	464	9-90C 6' SPEC	8-15 C 6' SPEC.	8-12 C 6' SPEC	1954	30" RCP	80'	CRUM CREEK
9-91C 6' SPEC.	466	9-92C STONE HD	8-12 C 6' SPEC.	8-11 C STONE HD	1955	30" RCP	275'	CRUM CREEK

FROM (NEW)	ID	TO (NEW)	FROM (OLD)	TO (OLD)	CONST DATE	PIPE	LENGTH	BASIN
9-9HC 6' SPEC.	465	9-91C STONE HD	8-13 C 6' SPEC.	8-10 C STONE HD	1954	90" RCP	252'	CRUM CREEK
9-91C STONE HD	459	9-92C JUNCT. BO	8-10 C STONE HD	8-8 C JUNCT. BOX	1956	36" RCP	75	CRUM CREEK
9-91C STONE HD	458	9-95C JUNCT. BO	8-10 C STONE HD	8-8 C JUNCT. BOX	1955	4'x4' 54" BOX CUL.	78'	CRUM CREEK
9-93C STONE HD	410	9-94C STONE HD	8-61 C STONE HD	8-62 C STONE HD	1955			CRUM CREEK
9-95C 4' SPEC	457	JUNCT 54" RCP	8-9 C 4' SPEC.	JUNCT 54" RCP	1955	18" RCP	76'	CRUM CREEK
9-96C 4' SPEC.	455	9-97C 4' SPEC.	8-6 C 4' SPEC	8-7 C 4' SPEC.	1955	15" RCP	54'	CRUM CREEK
9-97C 4' SPEC	456	9-98C JUNCT BOX	8-7 C 4' SPEC	8-8 C JUNCT BOX	1955	18" RCP	28'	CRUM CREEK
9-98C JUNCT. BO	460	15-1C JUNCT BOX	8-8 C JUNCT. BOX	8-13 C JUNCT BO	1965	60" RCP	200'	CRUM CREEK
9-99C TYPE M. IN	427	9-100C TYPE M. I	8-54 C TYPE M. IN	8-55 C TYPE M. IN	1985	12" CORRU. UD.	145'	CRUM CREEK

FORM H (Front)

PROPOSED FLOOD CONTROL PROJECT FORM H. SHEET 1 OF 1

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Joseph Mastronardo
Municipality:	Springfield Twp	Telephone:	(215) 222-3000
County:	Delaware Cty	Date:	7/18/2005

INSTRUCTIONS

On the map for proposed storm water collection systems, diagram each proposed system. Include a map point to show changes in system elements, pipe size, pipe direction and connections to existing systems. For proposed additions to existing systems, diagram only the additions and their connection point into the existing system. Complete a separate form for each proposed new system and one for each existing system having one or more proposed additions. Identify the points within a system consecutively (ex. H-1, H-2, H-3). Start the first point in each additional system 10 numbers higher (H-10 and) than the last point in the preceding system. Be sure to show the point where proposed additions connect into existing systems, using the map point number from the existing system form and map. See Sample Diagrams and Form on Reverse.

Map I.D. No.		System's Elements (x)			Measurements *					Map I.D. Nos.**	Proposed Const. Dates		Design Data	Contact Person Name and	Name of Final Ownership and
					Pipe	Open Channel / Swale			Material						
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth		Form A	Start	End	Avail.	Phone	Maintenance Responsibility
															Willow Bay Subdivision
H-1		Sewer							As Noted						Springfield Township
H-															
H-															
H-															
H-															
H-															
H-															
H-															
H-															
H-															
H-															

* See measurement key on reverse side. ** Enter the storm water problem areas' Map I.D. Nos., if proposed project will solve or reduce any / all of the drainage problems.

FORM I

PRESENT & PROJECTED DEVELOPMENT IN THE FLOOD HAZARD AREA (FORM 1)

SHEET ____ OF ____

WATERSHED		FORM COMPLETED BY	
Name:	Crum Creek	Name:	Joseph Mastronardo
Municipality:	Springfield Twp	Telephone:	(215) 222-3000
County	Delaware Cty	Date:	7/18/2005

DEFINITION

FLOOD HAZARD AREA:

A NORMALLY DRY LAND AREA THAT HAS BEEN OR IS SUSCEPTABLE TO BEING INUNDATED BY THE 100-YEAR FLOOD.

For County Use:

Map ID No.	TYPE OF DEVELOPMENT	Year Built	Contact Person Name, Address and Phone	Comments
I -				
I -				
I -				
I -				
I -				
I -				
I -				

NOT APPLICABLE

Form J

		WATER QUALITY PROBLEM AREAS FORM J. SHEET 1 OF 1											
WATERSHED					FORM COMPLETED BY								
Name:	Crum Creek				Name:	Joseph Mastronardo							
Municipality:	Springfield Township				Telephone:	(215) 222-3000							
County	Delaware County				Date:	7/18/2005							
SITE		J-1	J-2	J-	J-	J-	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems													
High Community Tolerance													
High Temperature													
High Turbidity													
Hydrocarbon Pollution													
Low Community Diversity													
Low Dissolved Oxygen													
Low pH													
Nutrient Enrichment													
Poor Habitat													
Other/Explanation Line No													
Potential Cause(s)													
Agriculture													
Construction Site		X	X										
Erosion													
Lake Discharge													
STP Outfall													
Other/Explanation Line No													
Frequency													
Year Most Recent Occurrence													
Year First Known Occurence													
Source of Information													
County Water Quality Study													
Drivehy													
Other/Explanation Line No.													
	EXPLANATION LINES												
1	Willow Bay Subdivision												
2	AQUA Pennsylvania												
3													
4													
5													
6													
7													
8													
9													
10													

Form O - Outfall Data

Person : Joe Rodo Date : 7/28/2005 Time since Last Rain was >= 72 Hours :

Quantity of Last Rain: < 0.1 inches > 0.1 Inches Days since Last Rain :

Municipality : Springfield Township Name of receiving water : Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No/ Not sure	Time (00:00 am/pm	Pipe Diameter (inches)	Depth of flow in pipe (inches)	Channel Deptr (feet)	Channel Bottom Width (feet)	Channel side slopes (H:V)	Flow Observed (Yes or No)	Water Color/Odor (specify if floatalbes, algae or sediment present	Descrive land use of upstream drainage area	Rating (0-2)
M1	1	Yes		44	8	10	25	2:1	Yes	Good	Ins	0
M2	2	Yes		8	0	12	15	Vertical	Yes	Good	Ins	0
a	3	Yes		8	0	N/A	35	2:1	Yes	Good	Rec	0
b	4	Yes		swale	0	1	35	4:1	Yes	Good	Rec	0
M3	5	Yes		24	0	N/A	35	1:2	Yes	Good	Rec	0
C1	6	Yes		swale	0	0.5	15	7:1	No	Good	aqua	0
d	7	Yes		swale	0	1	10	1:3	No	Good	aqua	0
C2	8	Yes		24	0	5	5	2:1	No	Good	R	0
B2	10	Yes		18 (at inlet)	0	3	10	2:2	Yes	Collapsed	R	2
B5	11/12	Yes		18	trickle	6	5	1:1	Yes	Orange in color	R	2
B8	13	Yes		24	0	2	5	1:1	Yes	Good	R	0
B9	14	Yes		24	1	7	5-10	2:1	Yes	Good	R	0
B6	17	Yes		30	0	4	10	1:1	Yes	Good	R	0
B3	18	Yes		30	1	3	8	1:5	Yes	Some algae	Rec	1
B1	19	Yes		24	0	4	8	2:1	Yes	Good	R	0
B4	21/22/23/24	Yes		18	0	N/A	15	1:1	Yes	Detatched	R	2
A23	25	Yes		30	trickle	3	7	Vertical	Yes	Brownish	R	1

Rating System :

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain

H:V - Horizontal to vertical ratio

Notes:

M2 - Cluster of approx 7 - 8" pipes along 50 stretch of retaining wall.

a - Baltimore Pike overpass. 8-12" roof drains.

M3 - No access, bad picture, approx 24"

M4 - Possible location directly behind batting cage in park. Dense cover and cliff. Rip-Rap visible only.

B2 - Collapsed Outlet. Data collected from inlet.

B5 - orange deposit clearly visible on riprap and outlet, no apparent odor

B7 - No one home / no access.

B4 - Heavily damaged pine tree down / pictures 21-24. 1 feet from pipe totally disconnected

A23 - Brownish deposits on pipe

Person : Joe Rodo Date : 7/26/05 & 8/23/05 Time since Last Rain was >= 72 Hours ?

Quantity of Last Rain, < 0.1 inches > 0.1 inches Days since Last Rain

Municipality Springfield Township Name of receiving water : Crum Creek

Pipe Swale #	Photo #	Storm Drain? Yes/No/ Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (inches)	Channel Depth (feet)	Channel Bottom Width (feet)	Channel side slopes (H:V)	Flow Observed (Yes or No)	Water Color/Odor (specify if floatables, algae or sediment present)	Predictive land use of upstream drainage area	Rating (0-2)
A22	26	Yes		24	trickle	10	10	1:1	Yes	Brownish	R	1
A21	27	Yes		18	0	5	6	Vertical	Yes	Good	R	0
A20	29	Yes		60	2	6	50	1:3	Yes	Good	Rural Home	0
A19	29	some channel		48" wide	1	1	4	Vertical	Yes	Good	R	0
C	30	Yes		15	0	3	6	1:3	Yes	Good	R	0
A18	31	Yes		N/A	N/A	2	N/A	N/A	N/A	N/A	N/A	N/A
A17	N/A	Yes		24	0	N/A	10	Vertical	Yes	Good	R	0
A14	37	Yes		24	0	10	10-20	1:1	Yes	Good	R	0
A15	33	Yes		48	0	12	15	1:3	No	Good	Rec	0
A7	34	Yes		N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	N/A
A16	35	Yes		15	0	N/A	N/A	N/A	No	Good	School	0
A10	36	Yes	8/23	24	1	10	10	1:1	No	Debris	R	0
A6	37	Yes	8/23	24	trickle	15	25	1:1	No	Algae Present	R	0
A13	38	Yes	8/23	48	1	5	15	stone wall	Yes	Good	R	0
A12	39/40	Yes	8/23	24	1	3	2	stone wall	Yes	Orange on Rip Rap	R	1
A11	41	Yes	8/23	18	0	2	10	2:1	No	2/3 blocked w/ debris	R	1
A9	42	Yes	8/23	swale	0	0	10	2:1	No	Good	R	0

Rating System :

0- No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1 - Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain

H:V = Horizontal to vertical ratio

Notes :

A22 - Brownish and orange deposits on pipe

B1 - Pipe slightly disconnected / skewed 4-5 feet from opening.

A2 - inaccessible (concrete overgrowth)

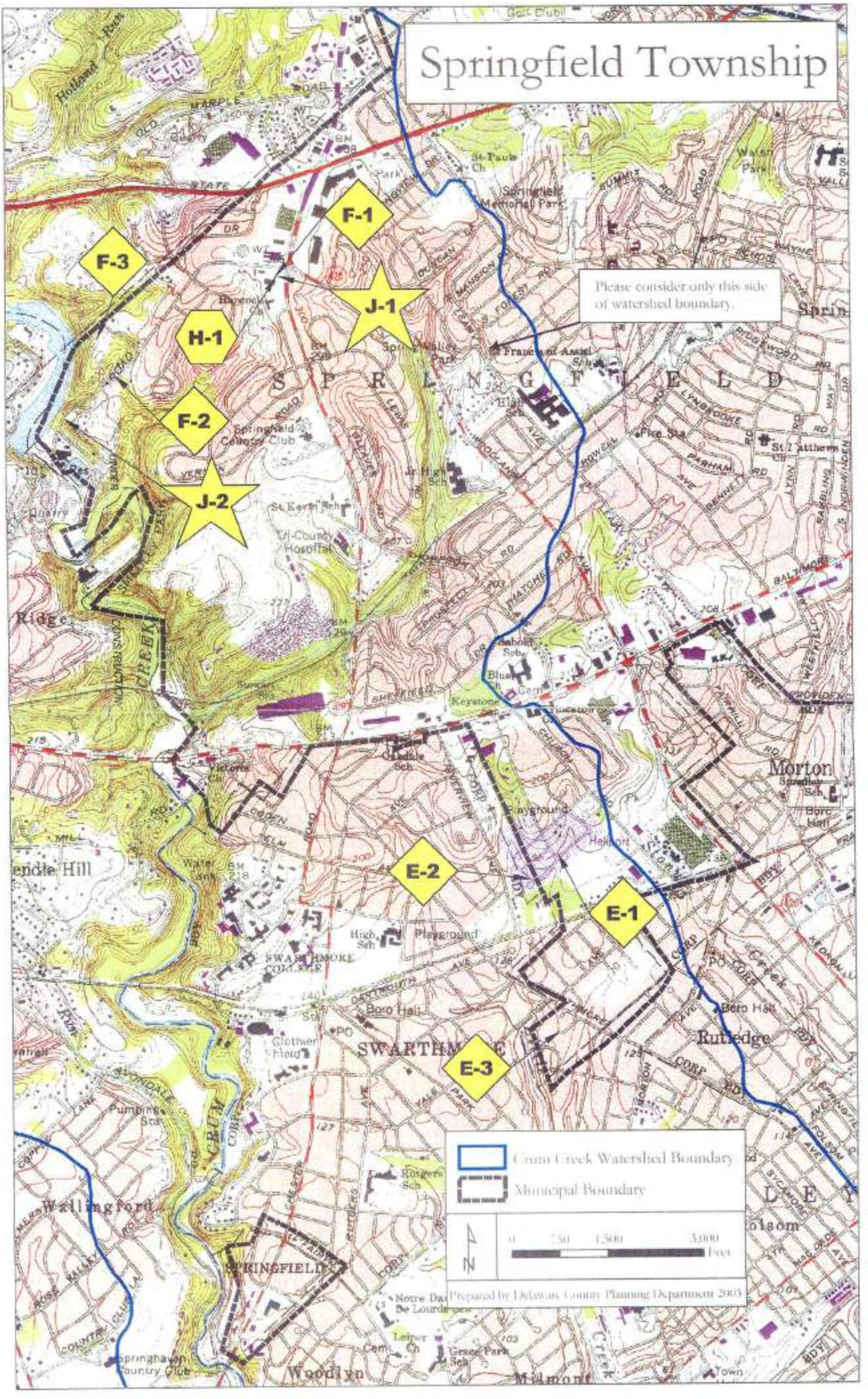
A5 - inaccessible (white fence along entire back of Country Club houses)

A2 - inaccessible (overgrowth/steep ravine)

A3 - inaccessible (overgrowth/steep ravine)

A4 - inaccessible (overgrowth)

A0 - Outlet structure unable to be located. Swale is defined as a result of the outfall, but overgrowth prevents finding the outfall


Springfield Township
F-1
F-3
J-1
H-1
F-2
J-2
E-2
E-1
E-3
Please consider only this side of watershed boundary.
Crum Creek Watershed Boundary
Municipal Boundary
0 750 1,500 3,000
Feet
N
Prepared by Delaware County Planning Department 2003



3



4



5



6



7



8



10



11

7-28
2005



13



14



17



18



19



21

82 - 2003



23



24



25



26



27



28



29



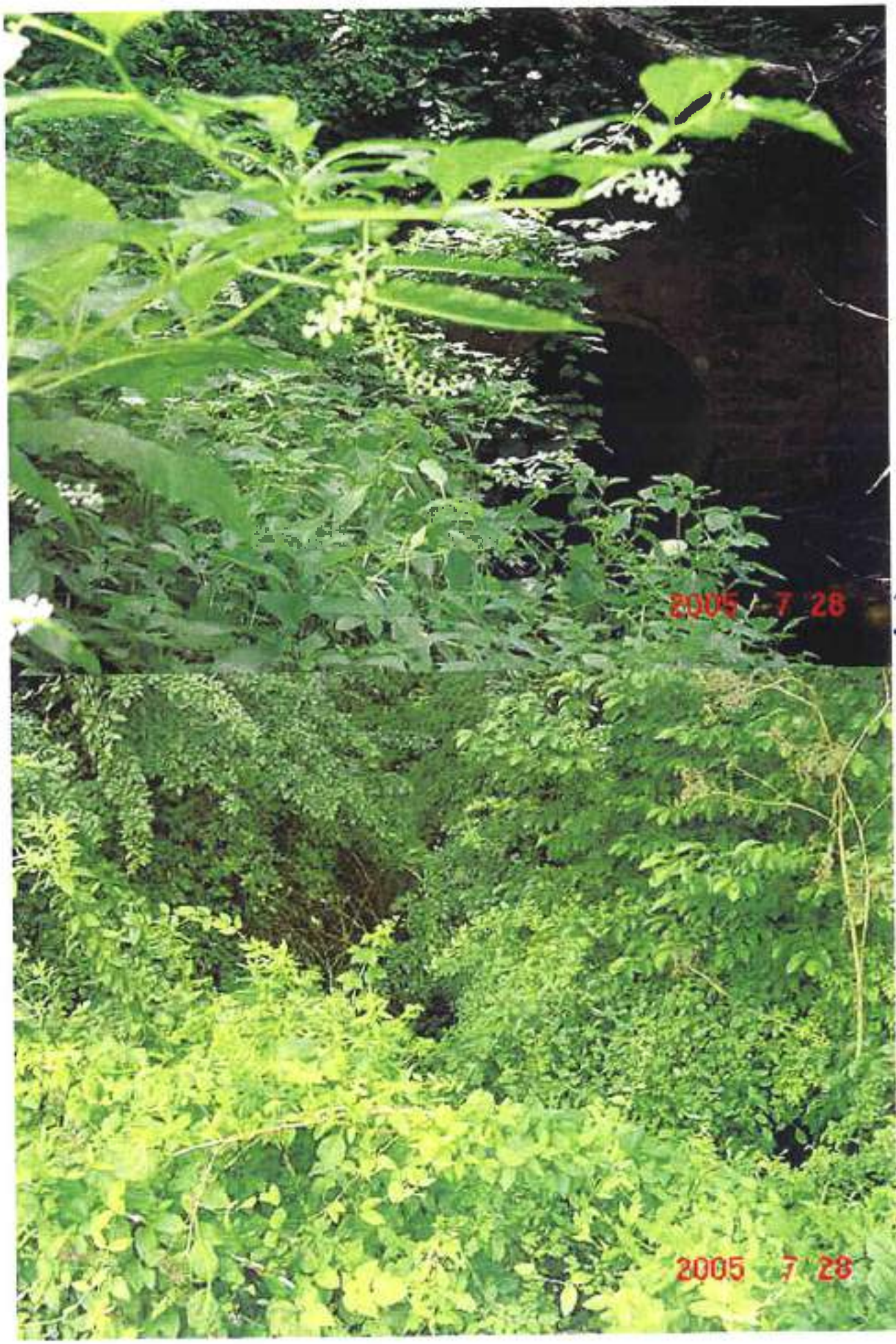
30



31



32


2005 7 28
33
2005 7 28
34



35



36



37



38



39



40



41



42

SWARTHMORE TOWNSHIP

Cover Page

User:	NSmith
Document:	municipalities.pdf
Server:	Z5400
Time:	09/09/05 14:10:38
Pages requested:	100
Page size:	Letter
Status:	OK

Group Name:

Notes:

Instructions:

Stadtmor (SWA)

FORM 6 - OBSTRUCTION DATA COLLECTION SHEET 2 OF 5

Municipal Stream Obstruction Data

Records completed by:

Watershed:

Field work personnel:

Municipality/County: / Delaware

Dates: 12/1 - 12/20/04

Mun. ID	Owner or Address Of Obstruction	Capacity (CFS)	Max. (ft²)	Opening Type: Part of Roadway	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert □	Opening Shape (✓): Culvert ○	Opening Shape (✓): Bridge ⌓	Opening Shape (✓): Bridge ⊓	Width/Heights: T (ft)	Width/Heights: D (ft)	Width/Heights: HT (ft)	Width/Heights: W (ft)	Width/Heights: FW (ft)	Width/Heights: above (ft)	MATERIAL / INLET CONDITION	NOTES
SWA 1			3	✓				✓		3	—	2	3	—	3		
				✓				✓		4.5	—	3	5	—	3		
							✓			1.5	1.5	—	—	—	3		
				✓					✓	1.5	—	3	8	—	3		
SWA 5				✓					✓	7	—	6	7	—	3		
SWA 6								✓		12	2	—	3	0.5	3		
SWA 7				✓				✓		3.5	—	3.5	5	—	3.5		
SWA 8				✓				✓		3.5	—	3.5	5	—	3.5		
SWA 9						✓				1.5	—	4	20	—	3		
SWA 10			1	✓				✓		1.5	—	2.5	12	—	1.5		
				✓				✓		2	—	2.5	12	—	1.5		

L:\GIS\Data\Municipalities\Arc81\DOCS\DataCollectionForms\obstforms.xls

Form O - Outfall Data

Person: O'BRIEN/COZZY Date: 3/23/04 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: SWARTHMORE Name of receiving water: LITTLE CRUM CREEK

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of Flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)	Headwall Yes/No
BEGINNING OF CREEK PIPES NOT VISIBLE FROM SHARON STREET 13	12	YES	8:40 AM	APPROX. 15"	1/2"	6"	1'	FLAT	MINIMAL	CLEAR	RESID	1	NO
14	4	"	"	30"	1/2"	1'	8	1:2	YES	CLEAR	"	0	YES
15	6	"	"	15"	0	5'	8'	1:2	0	N/A	"	0	YES
16	7	"	"	18"	0	2'	8'	1:2	0	N/A	"	0	YES
17	9	"	9:30 AM	18"	0	3'	6'	1:2	0	N/A	"	0	NO
COMES UNDER STREET 18 L 15 R 18	10	"	9:40 AM	15" 18"	0	1'	8'	1:1.5	0	N/A	"	0	YES FOUND STILL
19	DISK 2 1	"	9:30 AM	48"	0	1'	6'	1:1.5	MINIMAL	CLEAR	"	0	YES
20	2	"	9:40 AM	PARABOLIC 12"	0	1'	4'	1:1.5	"	"	"	1	NO
21	3	"	9:50	15"	0	6"	8'	1:2	0	NA	"	0	NO

UNDER WATER

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate erosion or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment – needs investigation (Flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical – rectangular channel

NOTES:

Form O - Outfall Data

Person: O'BRIEN/CUZZY Date: 3/23/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain _____

Municipality: SWARTHMORE Name of receiving water: LITTLE CRUM

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet).	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)	H.W.
22	4	YES	10/AM	30 1'	1"	6'	12'	1:2	YES	CLEAR	RESID	0	YES
PIPE DISCONNECTED 23	5	YES	10/AM	8"	0	0	N/A	N/A	NO	0	"	2	NO
24	6	YES	10 04 AM	48"	3"	3'	8'	1/2	YES	CLEAR	"	0	YES
BRANCH INSIDE 25	7 8	YES	10 11 AM	SQUARE 4'X10'	2"	3'	10'	1:2	0	"	"	0	YES
26	9	YES	10 20 AM	18"	1"	2'	10'	1:2	YES	CLEAR	"	0	NO
2 HOLES INSIDE 27	10	YES	10 30 AM	SQUARE 4'X10'	N/A	3'	8'	1:2	0	"	"	0	YES
28	DIER 3 1	YES	10 40 AM	15"	0	1'	5'	1:1.5	0	N/A	"	1 BLOCKED	YES
29	2	YES	10 45 AM	18"	0	2'	10'	1:2	0	N/A	"	0	YES
30	3	STREET BYPASS	11 00 AM	2 INLETS DUMP INTO PIPE 30	N/A	1'	8'	1:2	0	CLEAR	"	0	YES

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigating (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or corroding, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: G. PRIEN & CREW Date: 3/23/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain _____

Municipality: SWARTHMORE Name of receiving water: _____

HW

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)	
2 INLETS ABOVE	31	DISK 3 4	STREAM FLOWS UNDER ST.	10 AM 55	2 INLETS ABOVE RUN INTO STREAM 3'x6'	N/A	4'	4'	1:2	0	~~CLEAR~~	RES	0	YES
2 PIPES	32	5	YES	11 00 AM	15" 18" MUDDY WATER	0	1'	8'	1:2	0	N/A	"	"	YES
	33	6	YES	11 05	15"	0	3'	8'	1:1.5	0	N/A	"	0	YES
UNDER STREET	34	7	YES	11 20 AM	18"	0	2'	1'	INTO STREAM	0	N/A	"	0	YES
	35	8	YES	11 20 AM	12"	0	6'	6'	INTO STREAM	0	N/A	"	0	YES
	36	9	YES	11 25 AM	18"	0	8'	8'	1:2	0	N/A	"	0	YES
	37	10	YES	11 30	15"	0	3'	5'	1:1.5	0	N/A	"	0	YES
	38	DISK 4 1	YES	11 35	5' x 5' SQUARE	2"	3'	20'	1:2	YES	CLEAR	"	0	YES
3 12" PIPES FROM ST. ABOVE	39	2 3	YES	11 40	12" x 12" SQUARE STREAM RUNS THRU (3 12" PIPES)	0	1'	10'	1:2	NO	N/A	"	0	YES

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, oily or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: O'BRIEN / COZZY Date: _____ Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches: Days Since Last Rain _____

Municipality: SWARTHMORE Name of receiving water: _____

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (0:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
40	4	YES	11:50 AM	24"	0	[illegible]	[illegible]	1:1.5	0	N/A	RES	1
41	5	YES	12:23	18"	0	1'	[illegible]	1:1.5	0	N/A	"	0
42	6	YES	12:27 PM	24"	TRICKLE	-6"	1'	1:1.5	TRICKLE	CLEAR	RES	0
43	7	YES	12:30	24"	12"	1'	6'	1:1.5	YES	CLEAR	RES	1
44	8	YES	12:43 PM	18"	0	6"	6'	1:1.5	NO	N/A	RES	0
45	9	YES MAINLINE	12:47 PM	15"	0	6"	6'	1:1.5	NO	N/A	RES	2
46	10	YES	12:47 PM	30"	1/2 INCHES	6"	7'	1:1.5	TRICKLE	TRICKLE	RES	0
47	PICS 1	YES	12:50 PM	30"	NO	1'	7'	1:1.5	NO	N/A	"	0
49	2	YES	1:00 PM	[illegible]	0	6" [illegible]	15'	1:1.5	NO	N/A	RES	0

HD WALL

PIPE SEPERATED YES

YES

NO

NO MADE UNDERGROUND

NO

PIPE BROKEN OFF FROM HDW

YES

NO

YES (UNDER ROAD)

RIDLEY TOWNSHIP (2) 15" PIPES UNDER ROAD

9' X 15' SQUARE

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or odors, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

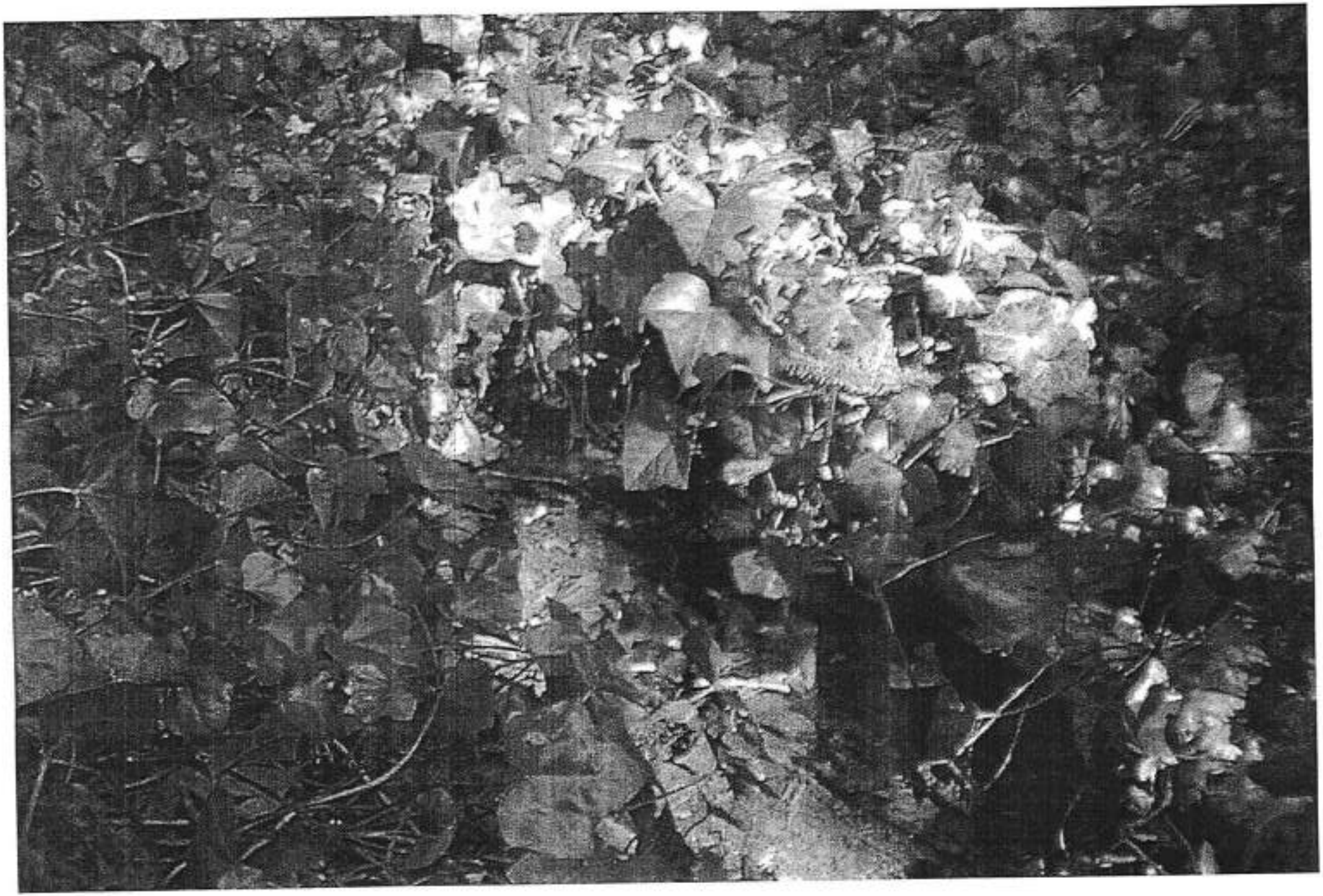
H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:



Pipe Swale #13 Little Cotton Creek Photo 2

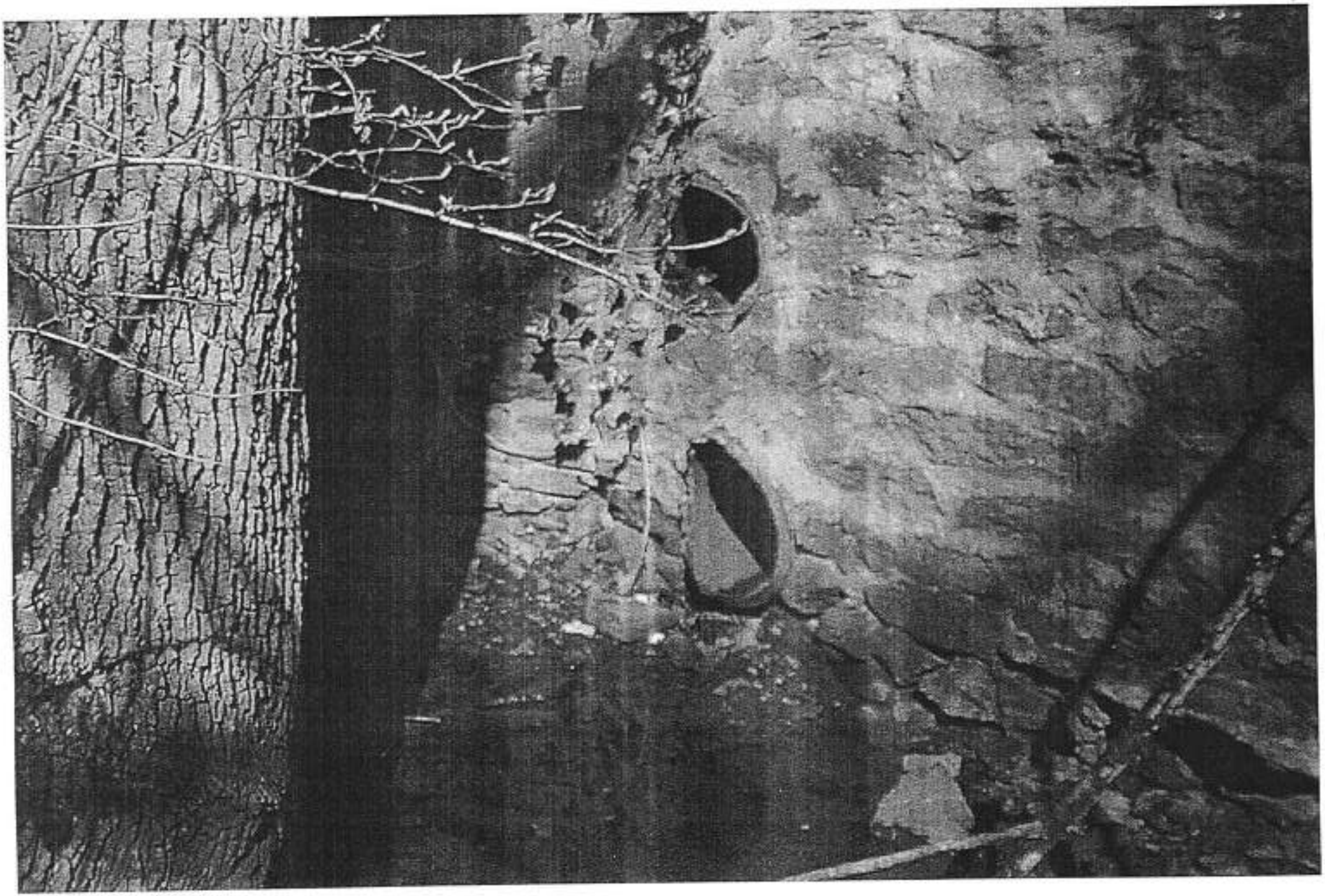


Pipe Swale #13 Little Crum Creek Photo #3

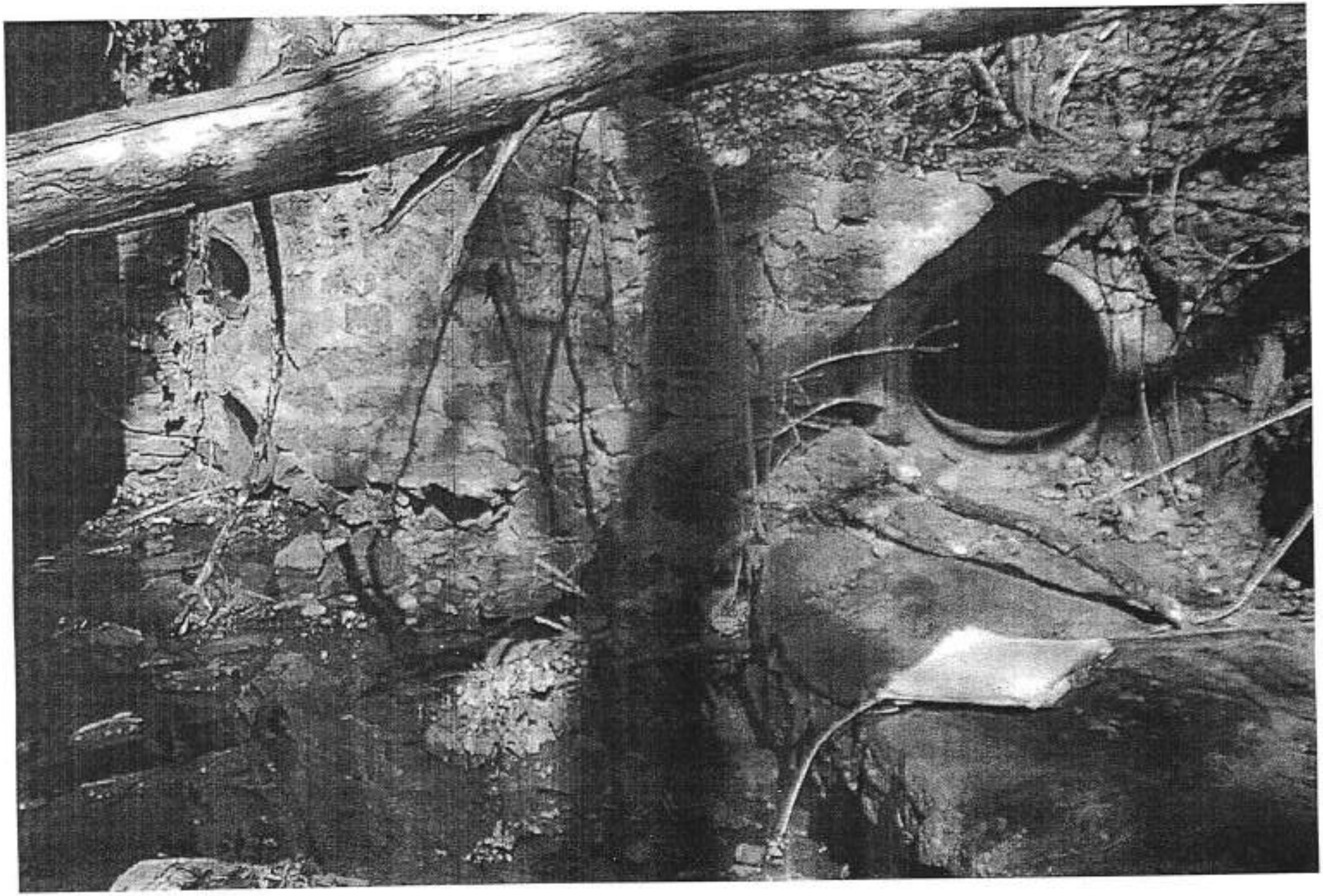


Pipe Sample #14 Little Cabin Creek Photo #4

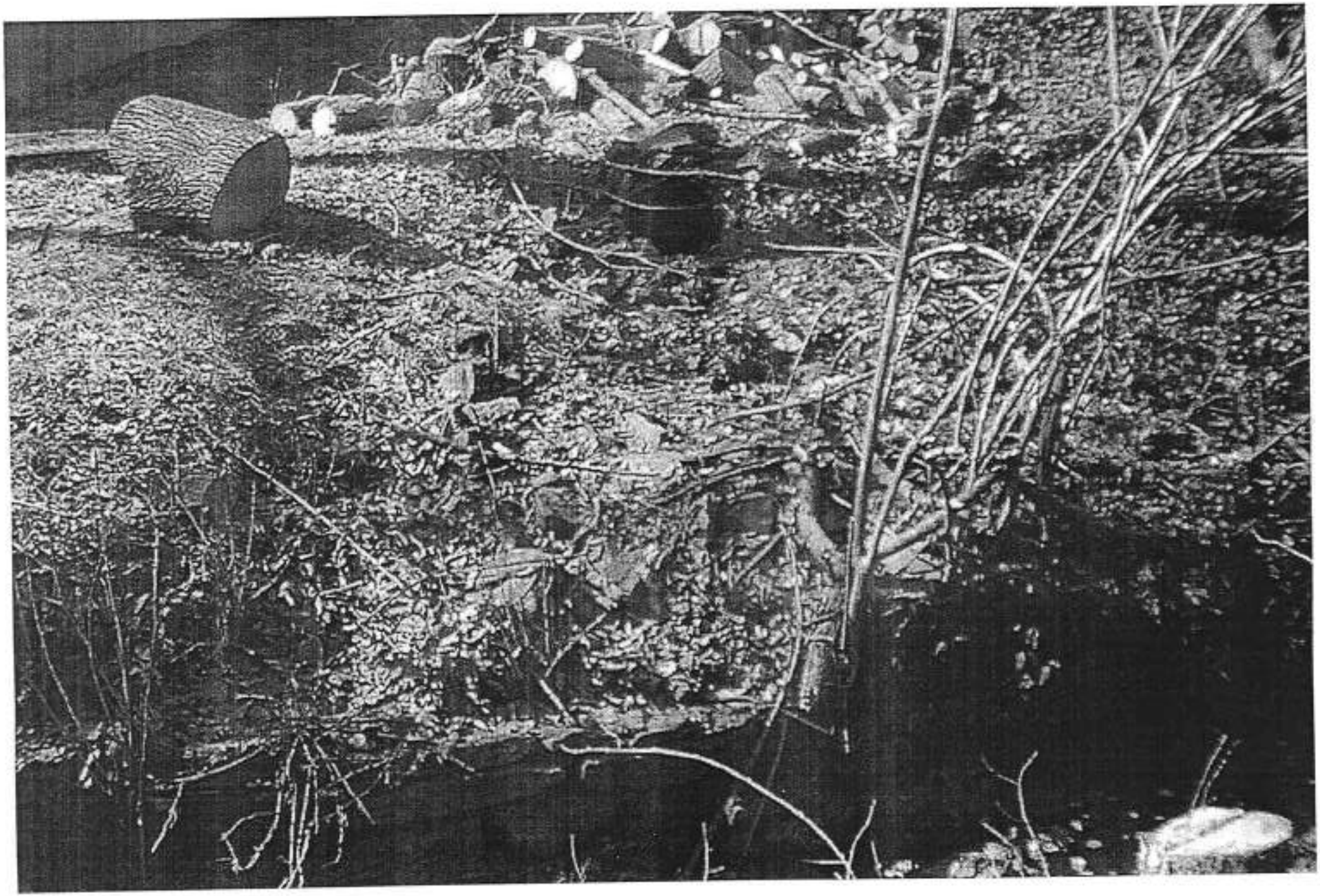


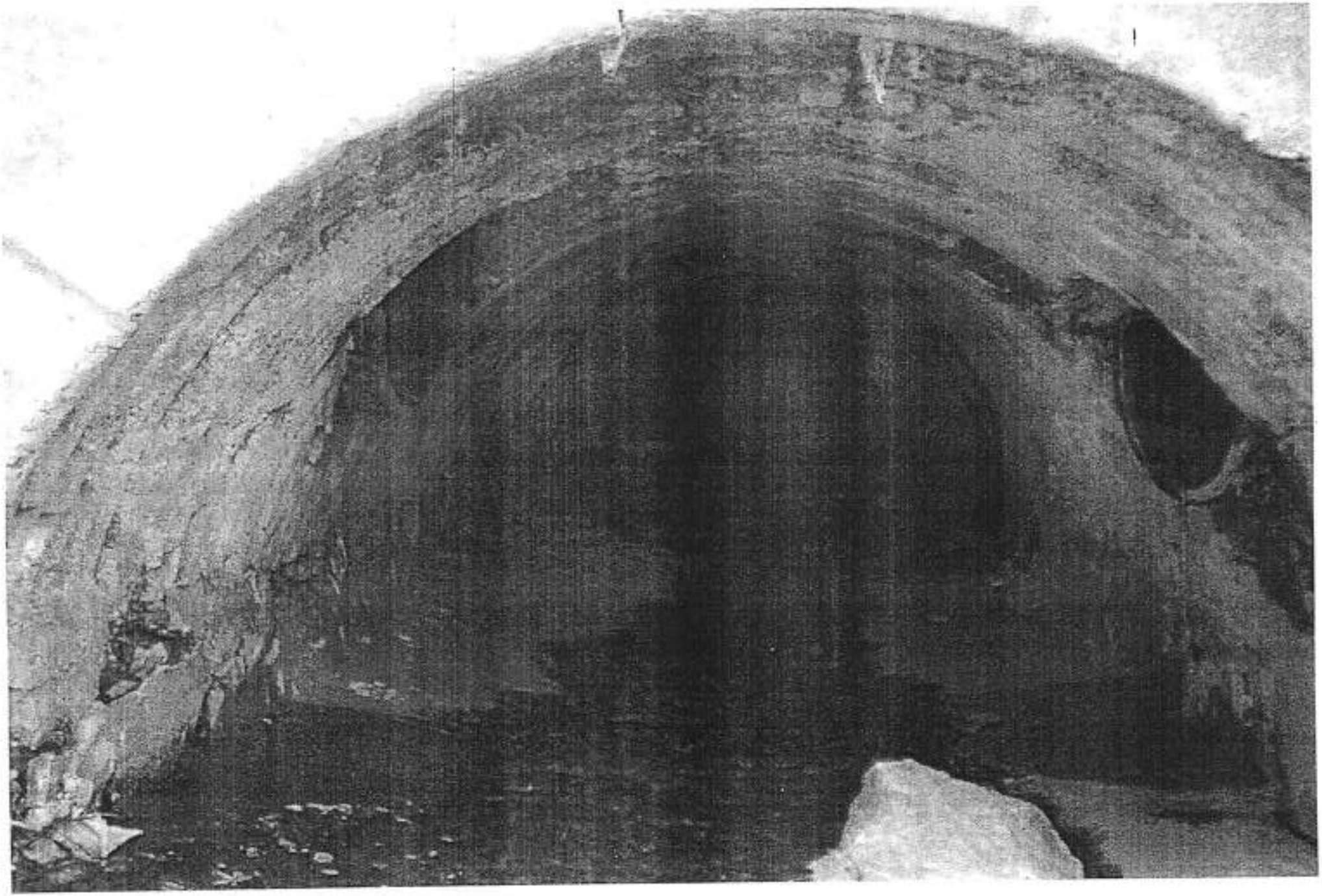


Pipe Source # 16 Little Cream Creek Priority



Pipe Survey #17 Little Cedar Creek Picture #7

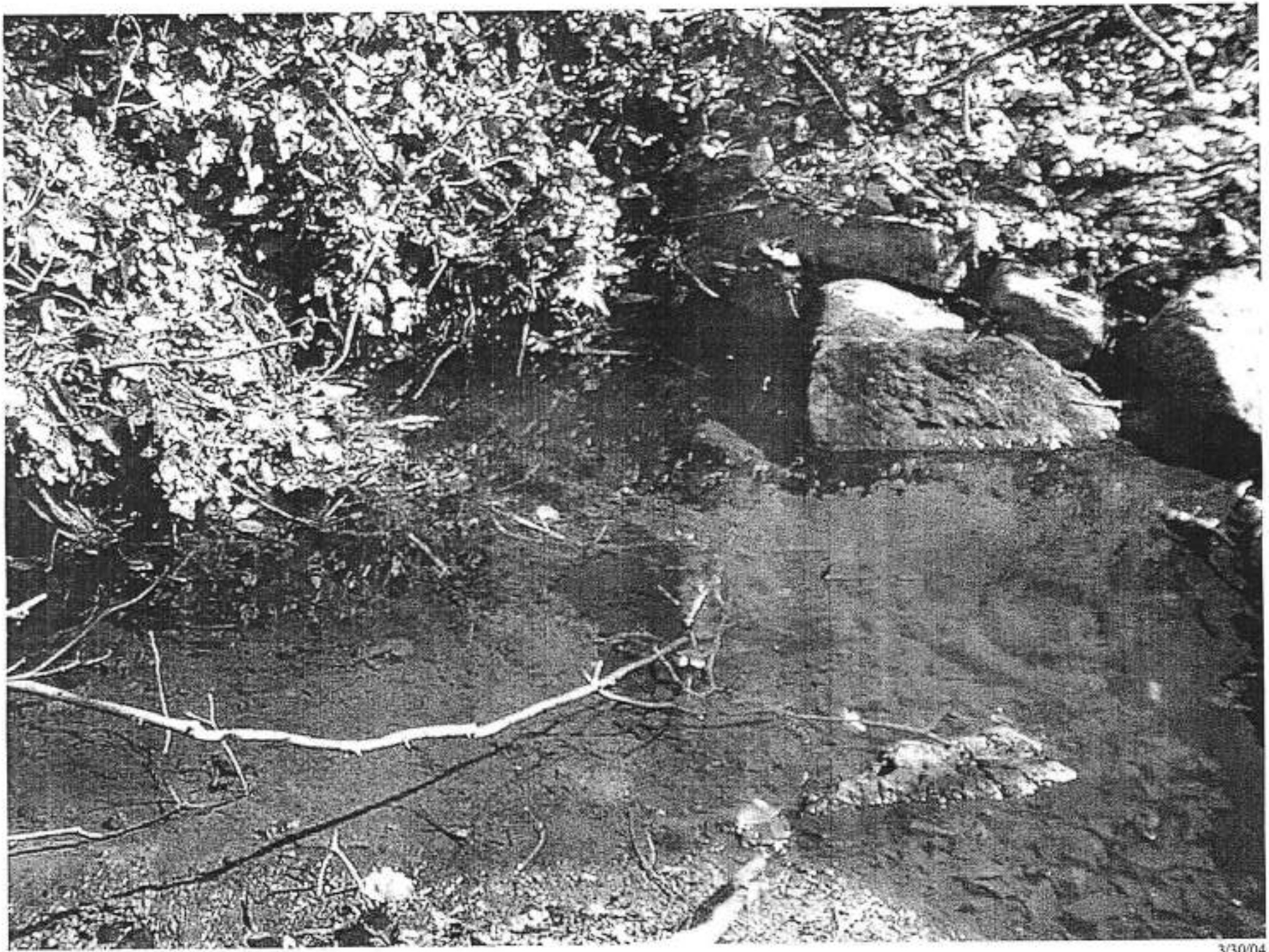




Pipe Sample #19 Little Calumet Creek Disk 2 - Photo #1



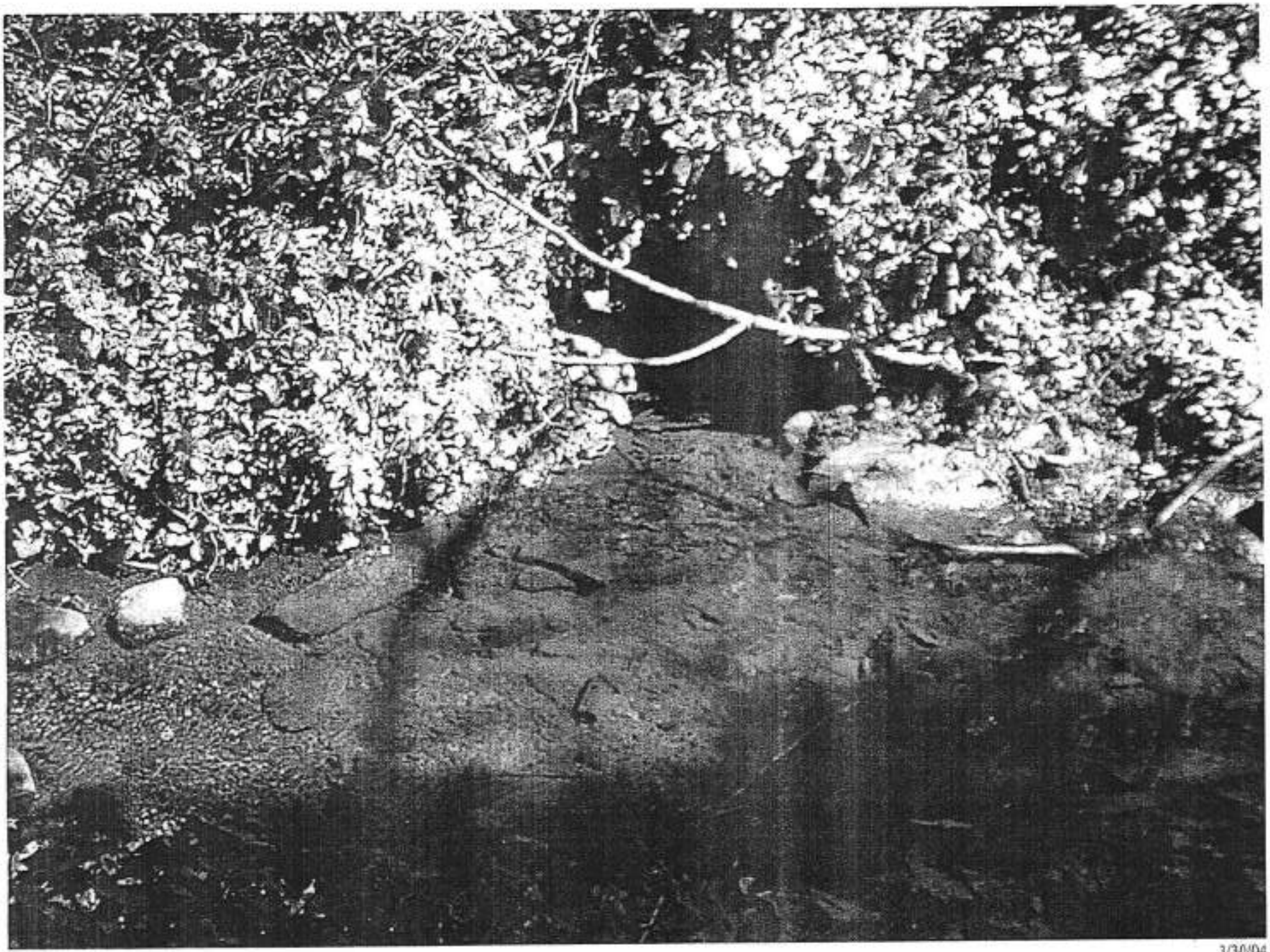
Pipe Swale #30 - Swarthmore, Little Crum Creek Disk #2 - Photo #2



3/30/04

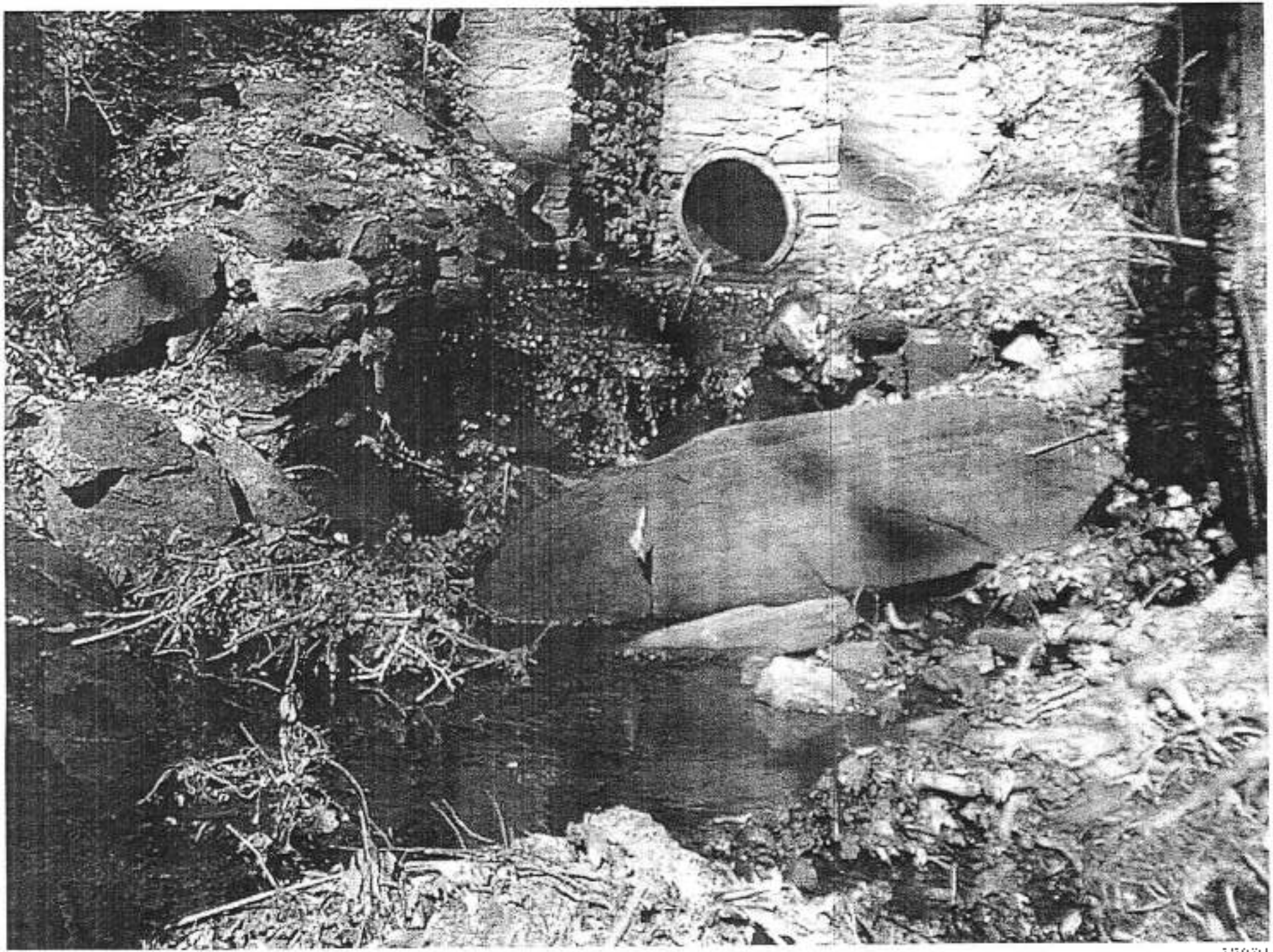
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Pipe Swale #21 Swantamere, Little Crum Creek Disk #2 - Photo #3



3/30/04

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Pipe Swale #23 - Swarthmore, Little Crum Creek Disk #2 - Photo #5



3/30/04

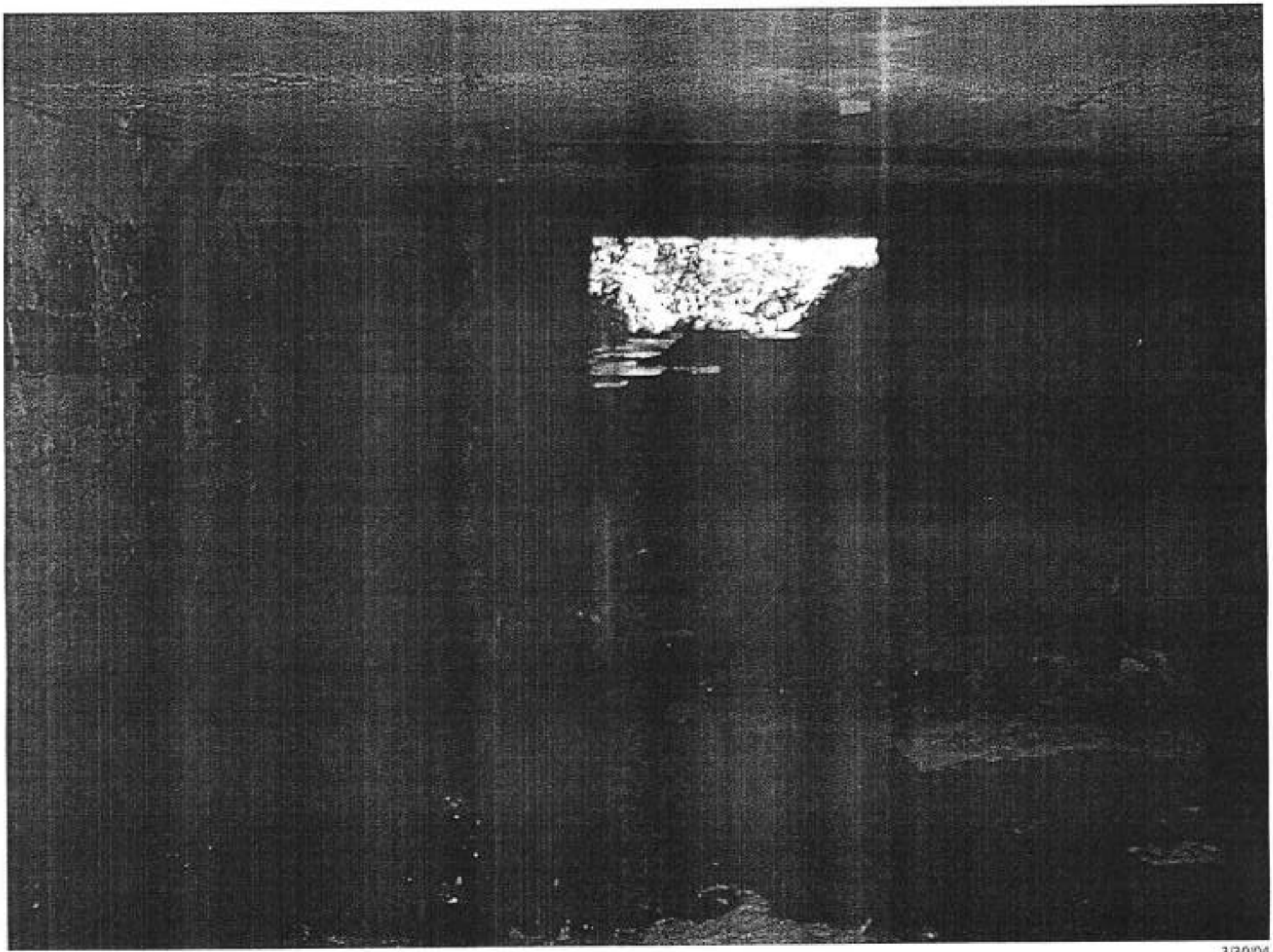
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Pipe Swale #24 - Swarthmore, Little Crum Creek Disk #2 - Photo #6



3/30/04

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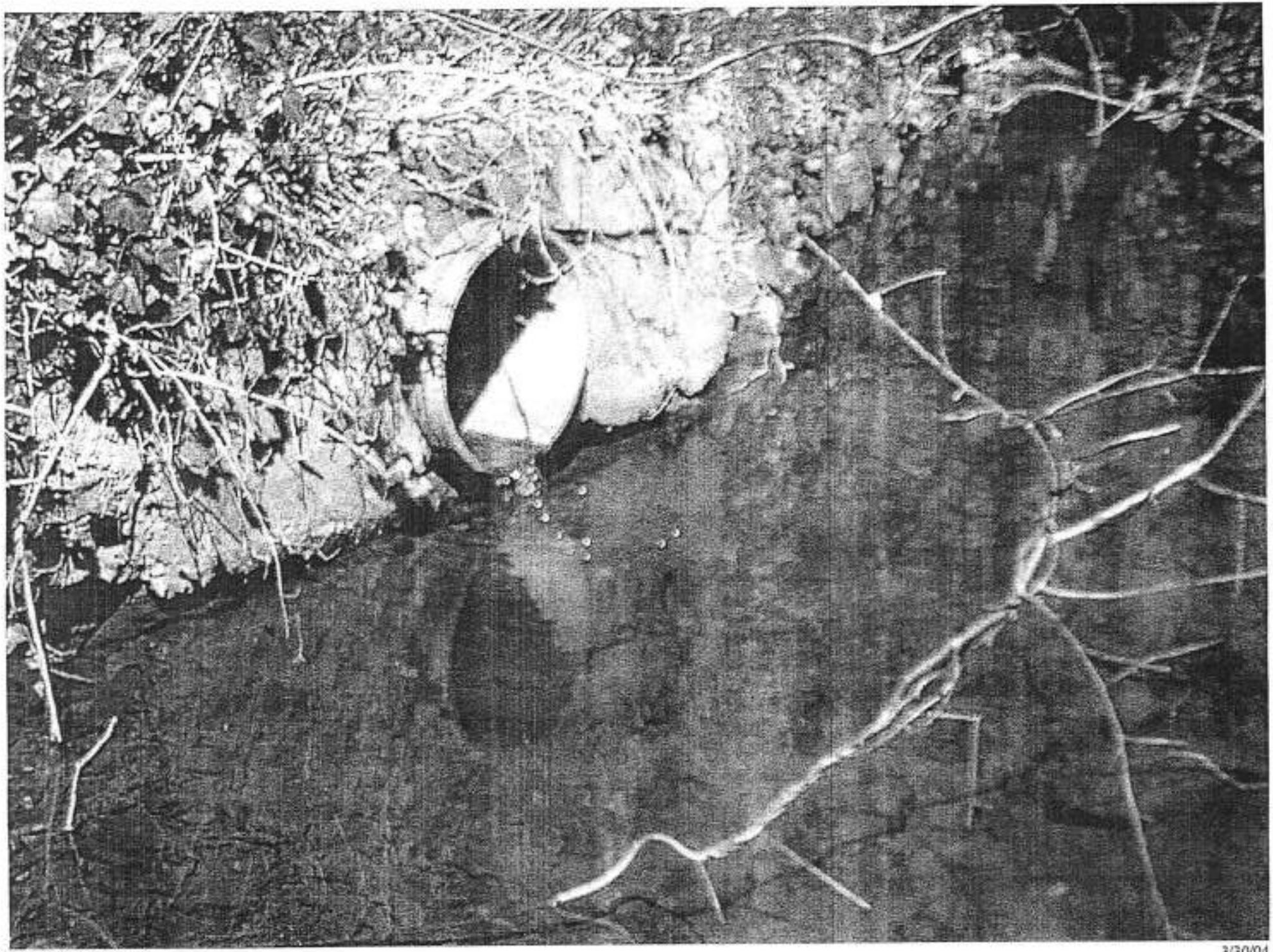


Pipe Swale #23 - Swarthmore, Little Crum Creek Disk #2 - Photo #5



3/30/04

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Pine Swale #27 Swarthmore, Little Crum Creek Disk #3 - Photo #10



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3/30/04

Pipe Swale #26 - Swarthmore, Little Crum Creek Disk #3 - Photo #1



3/30/04

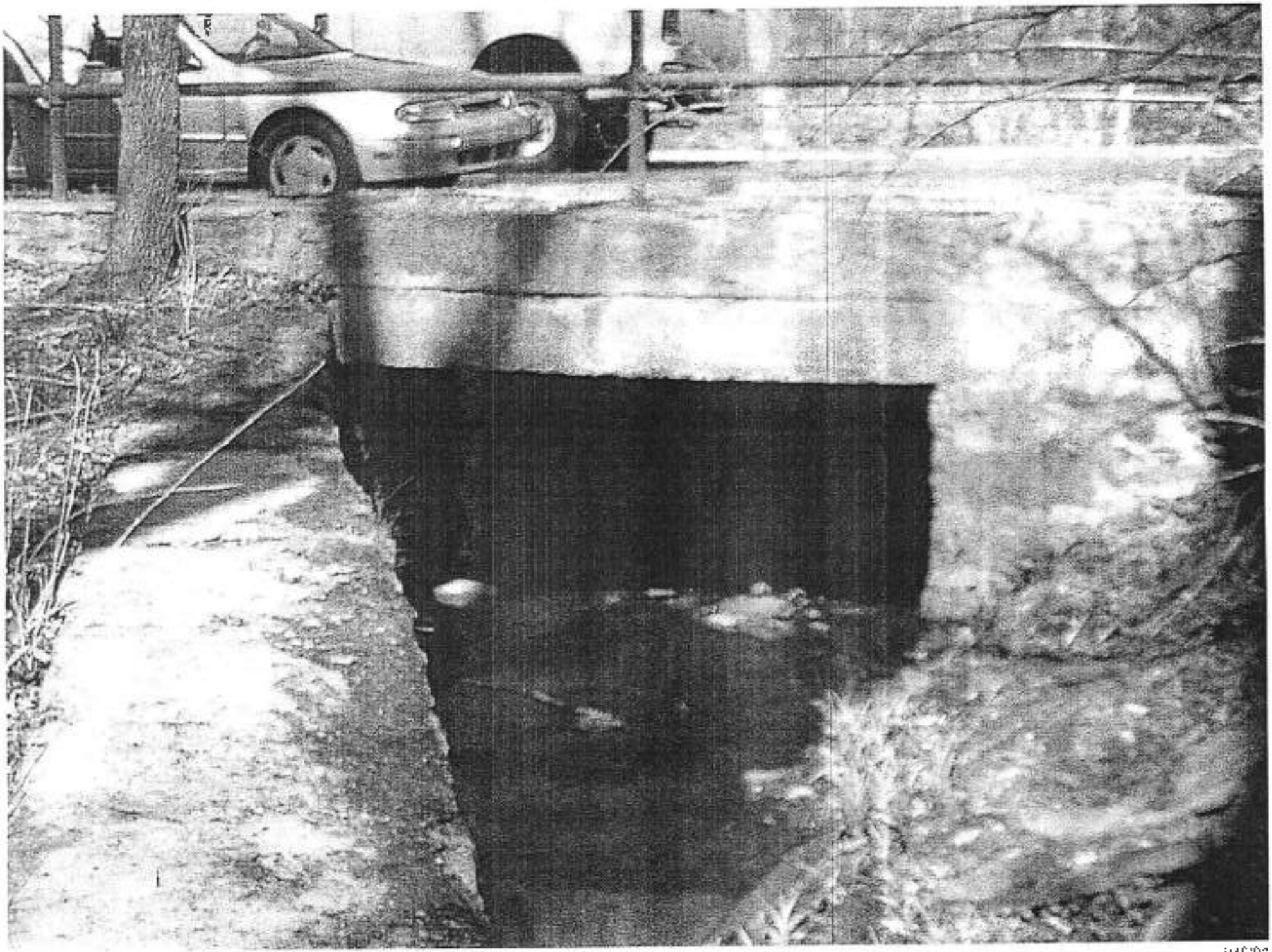
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Pipe Swale #29 Swarthmore, Little Crum Creek Desk #5 - Photo #2



3/30/04

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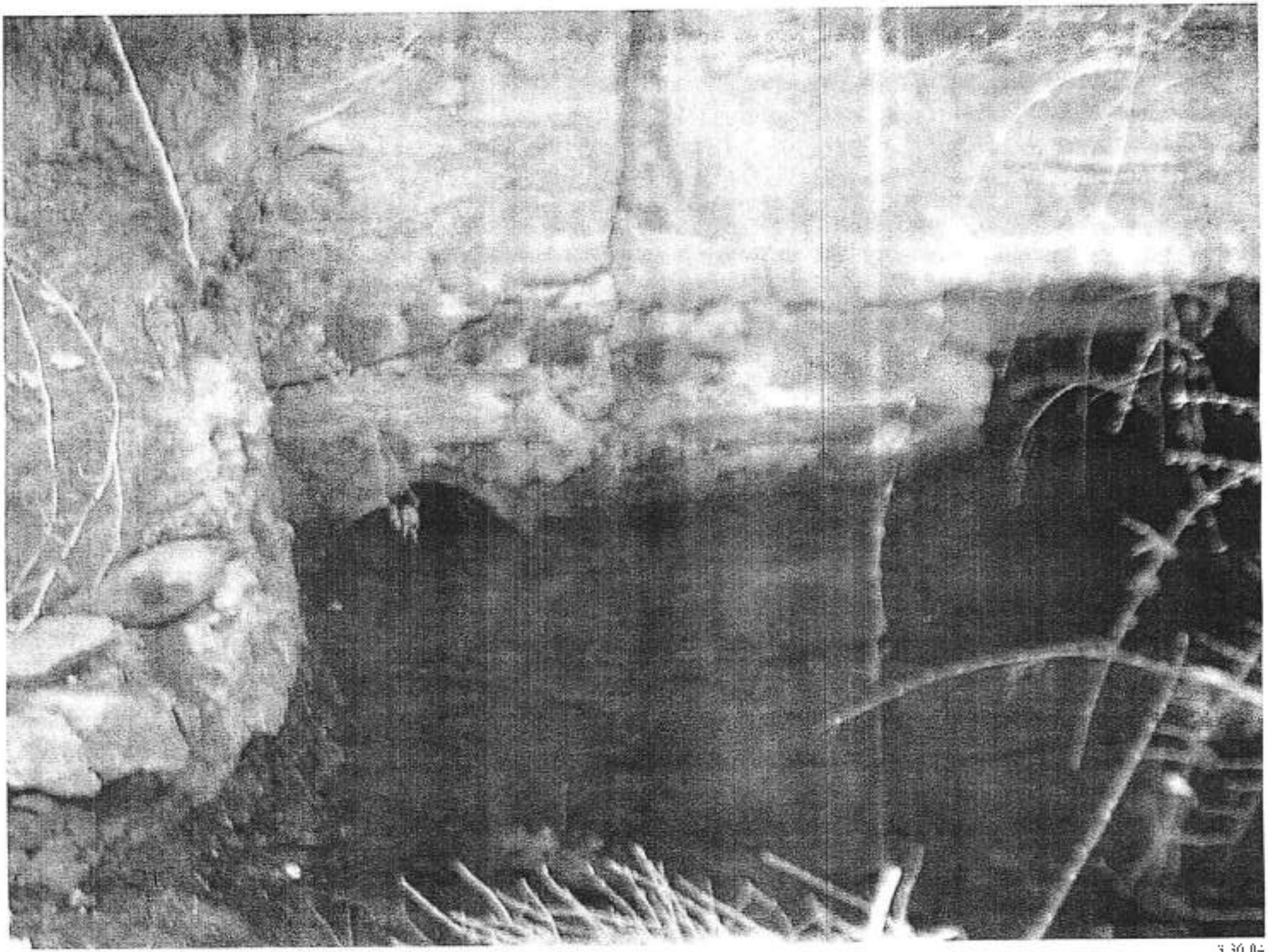
Pipe Swale #11 - Swarthmore, Little Crum Creek Disk #3 - Photo #4



3/30/04

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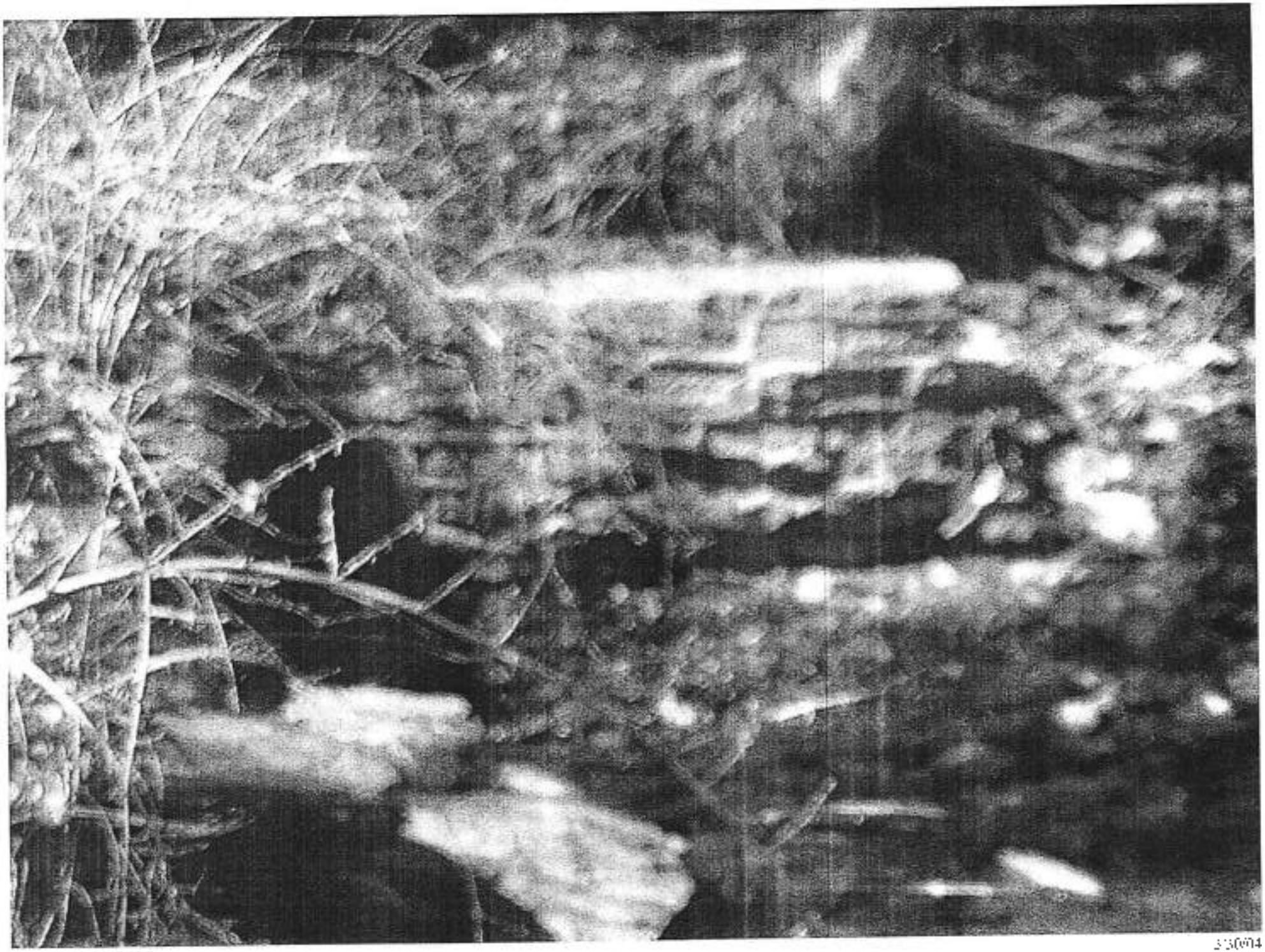
Pipe Swale #32 - Swartzmore, Little Crum Creek Disk #3 Photo #5



5-30-04

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Case Swale #33 - Swanthmore, Little Crum Creek Disc #3 - Photo #6

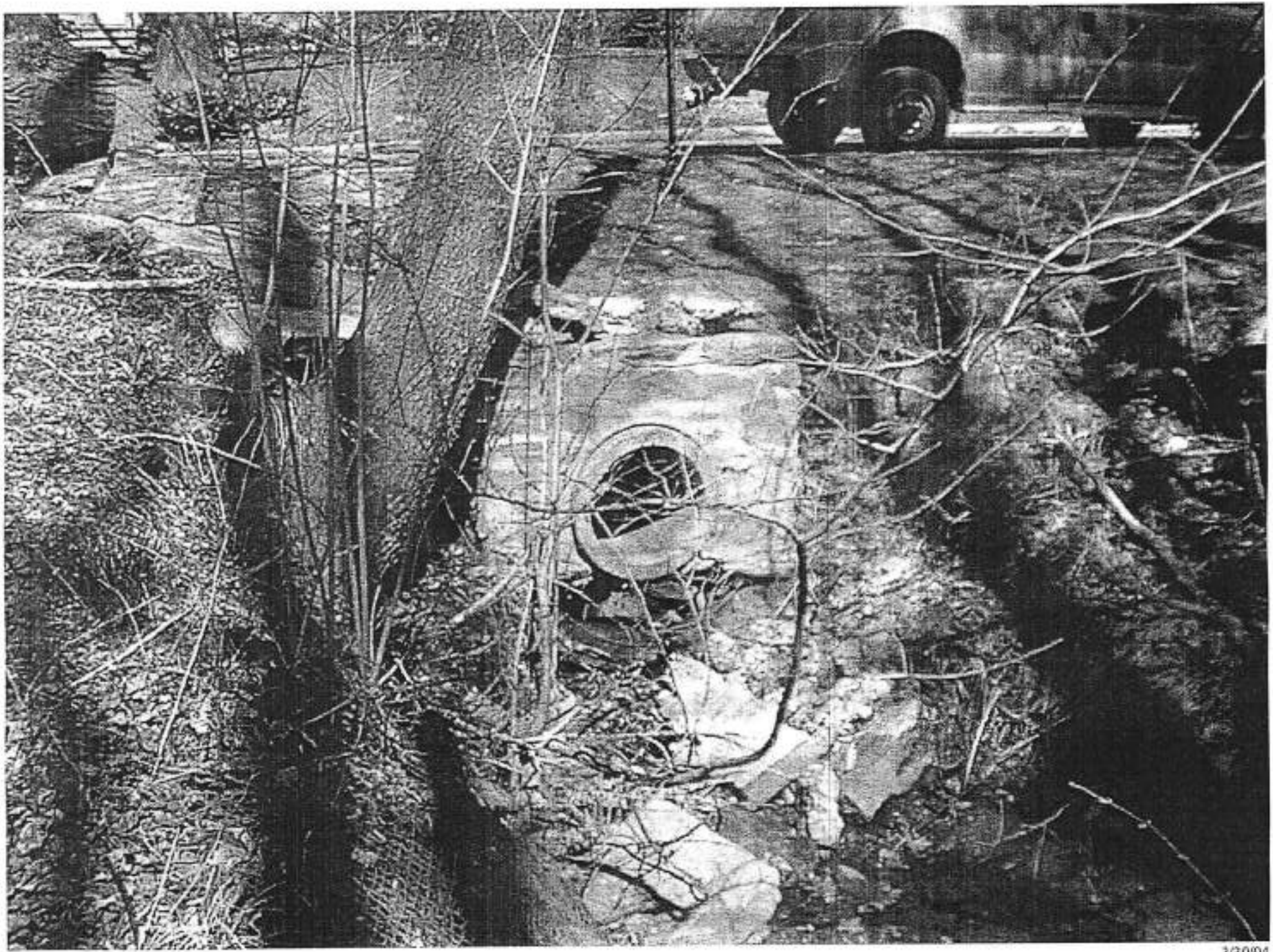


330694

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Pipe Swale #36 - Southeast, Little Cram Creek, Disk #2 - Photo #9



3/30/04

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Pipe Swale #38 Swedetown, Little Chain Cross Disk #4 - Photo #1



3/30/04

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Pipe Swale #39 - Swamphouse, Little Crum Creek Disk #4 - Photo #2

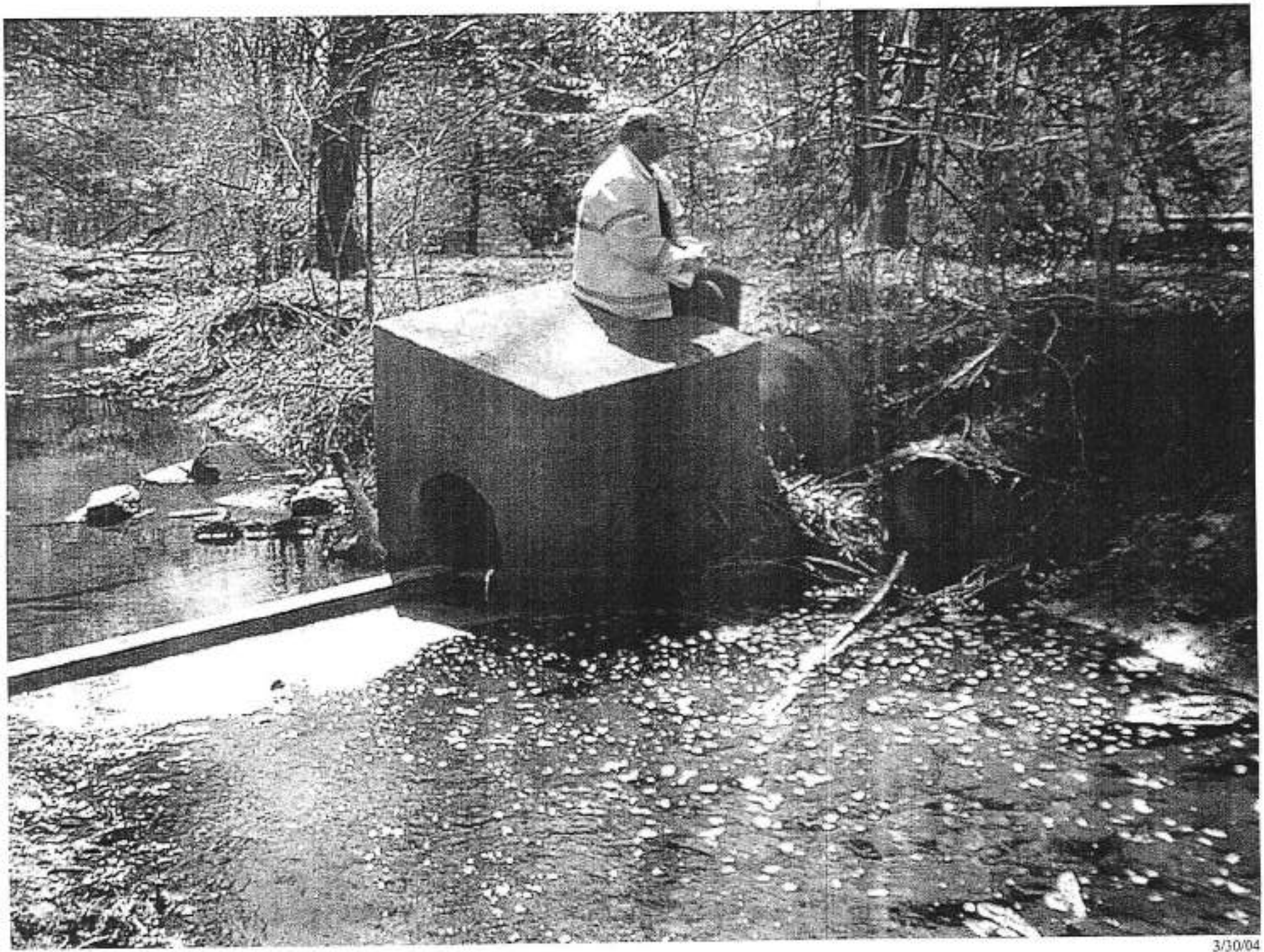


3/30/04

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Pipe Swale #40 - Swarthmore, Little Crum Creek Disk #4 - Photo #4



3/30/04

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Pipe Swale #41 - Streamhouse, Little Drum Creek Disk #4 - Photo #5



3/30/04

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Pipe Swale #42 - Swarthmore, Little Crum Creek Disk #4 - Photo #6



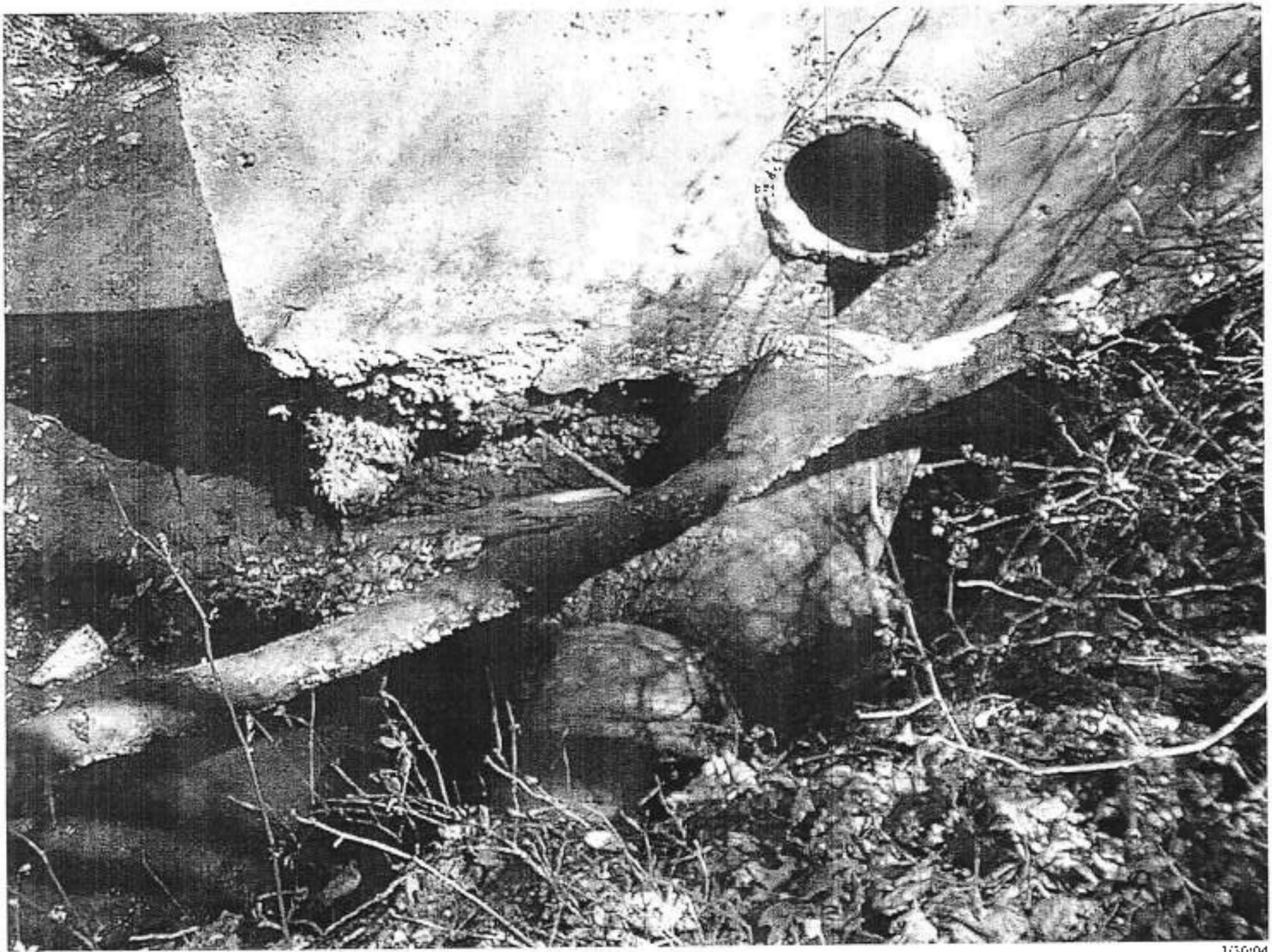
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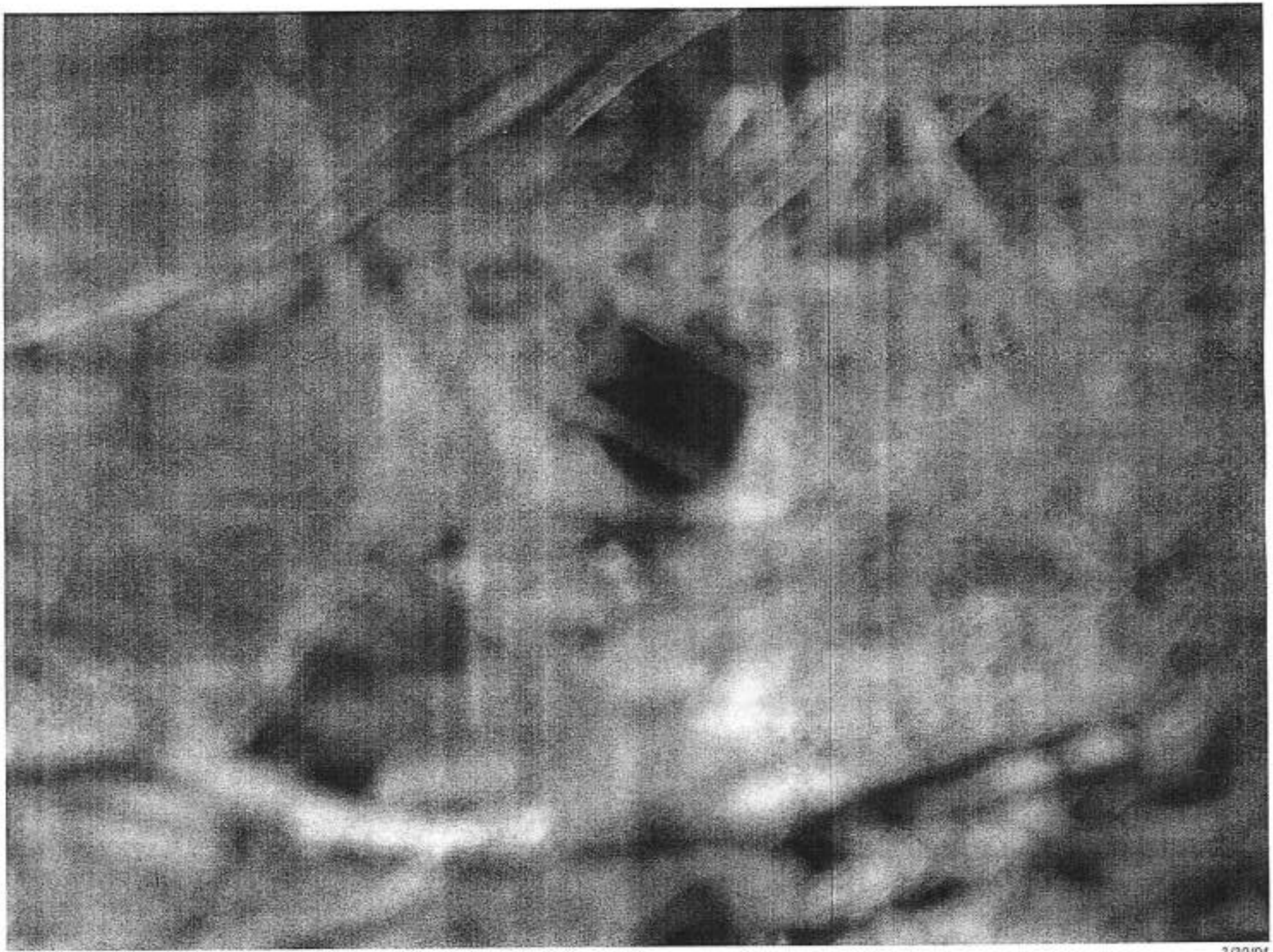
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Pipe Swale #45 - Swanbanore, Little Crum Creek, Disk #4 - Photo #9

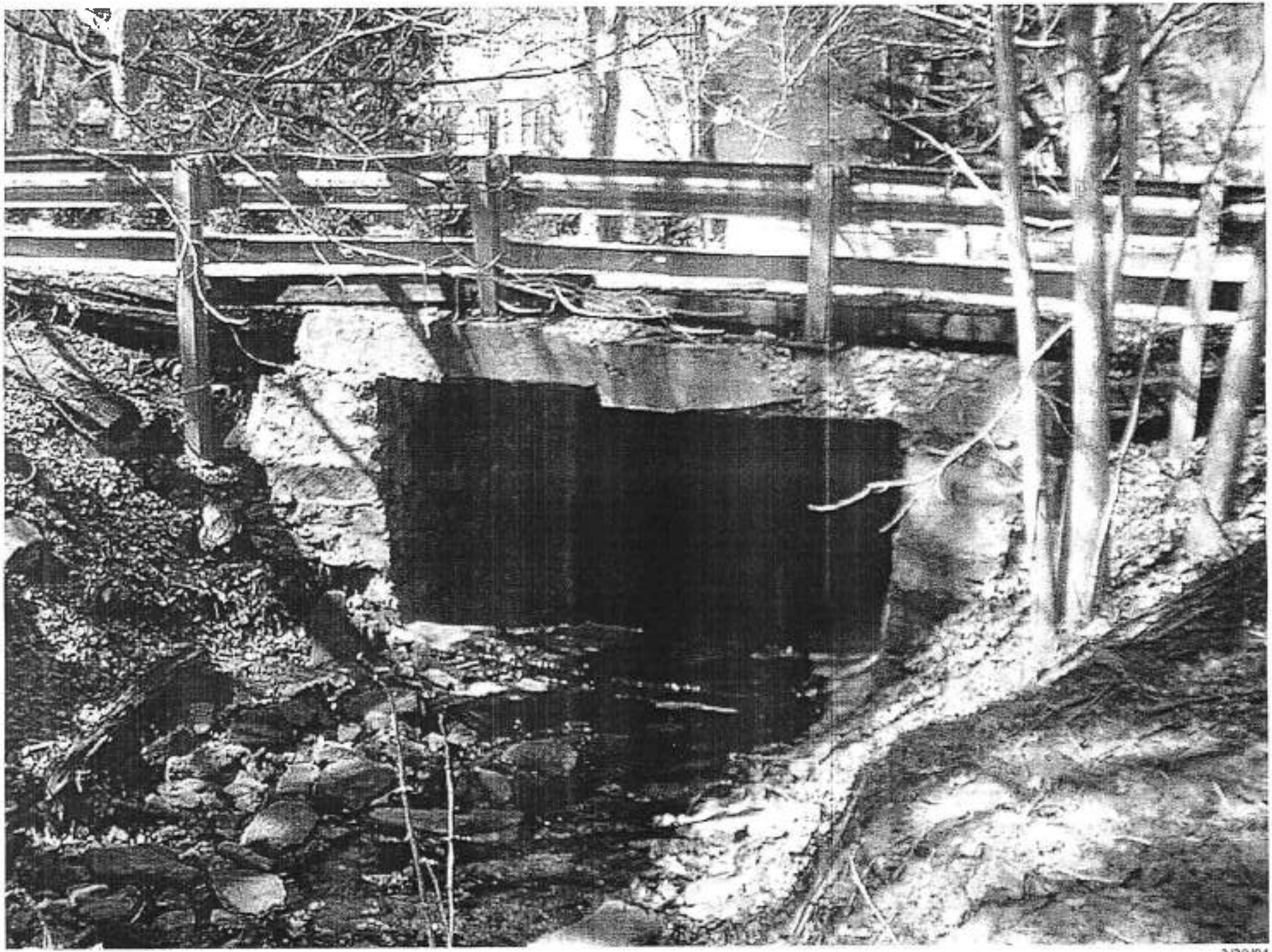


3/30/04

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3/30/04

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Form O - Outfall Data

Person: O'BRIEN/CUZZY Date: 3/9/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 3/9/04 (½ DAY)

Municipality: SWARTHMORE Name of receiving water: CRUM CREEK

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)	Headwall Yes/No
1	1	YES	8:45 AM	24" 36"	0 1/2"	5' 1'	5' 5'	1:2 1:2	NO YES	~~CLAY~~ CLEAR	RESIDENTIAL	0	TIMBER TIMBER
2	2&3	"	"	BURIED DRAINAGE	0	1'	20'	1:2	NO	N/A	"	2	YES
3	3&4	"	9:15 AM	24"	3"	DUMPS into STREAM	N/A	N/A	YES	CLEAR	"	PIPE FILLED 1	NO
4	5	"	9:30 AM	18"	0	N/A	N/A	1:1	NO	LEAVES	"	0	NO
5	6	"	9:45 AM	48"	1"	7'	5'	1:2	YES	CLEAR	"	0	NO
6	7	"	10:00 AM	15"	0	2'	4'	1:1.5	NO	N/A	"	0	NO
7	8	YES	10:20 AM	30" 48"	1" 1"	~~2~~ FT	10'	1:2	YES	CLEAR	"	0	YES
8	9	YES	10:35 AM		0	.2 FT	~~1/2~~ 1'	1:1	NO	N/A	"	0	YES
9	10	YES	10:45	12"	0	N/A	N/A	N/A	NO	N/A	"	LEAVES 1	NO

3 IS REVERSE

Rating System:

0=No observed impairment (No dry weather flow, no solids, foreign odor or debris, no erosion or sediment, pipe in good repair)

1=Needs maintenance (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow emulsions, odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, ~~blocked~~ with grease or debris)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: O'BRIEN/CUZZY Date: 3/9/04 Time Since Last Rain was ≥ 72 Hours: Yes_____

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain _____

Municipality: SWARTHMORE Name of receiving water: CRUM CREEK

3 PIPES INSIDE HDWALL

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)	Headwall Yes/No
10	1 DISK2	YES	11:00 AM	8" 18" 8"	8"	2'	9'	1:1.5	NO YES	CLEAR	COLLEGE	0	YES
11	2	YES	11:05 AM	18"	0	1'	12'	1:1.5	NO	N/A	RESID	0	YES STONE
12	3	YES	11:20 AM	18"	0	1'	12'	1:2	NO	CLEAR	"	0	

3 PIPES 18" 18" 15"

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or corroding, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Swarthmore - Pipe swale 1 - Disk 1 - Photo 1



3/9/04

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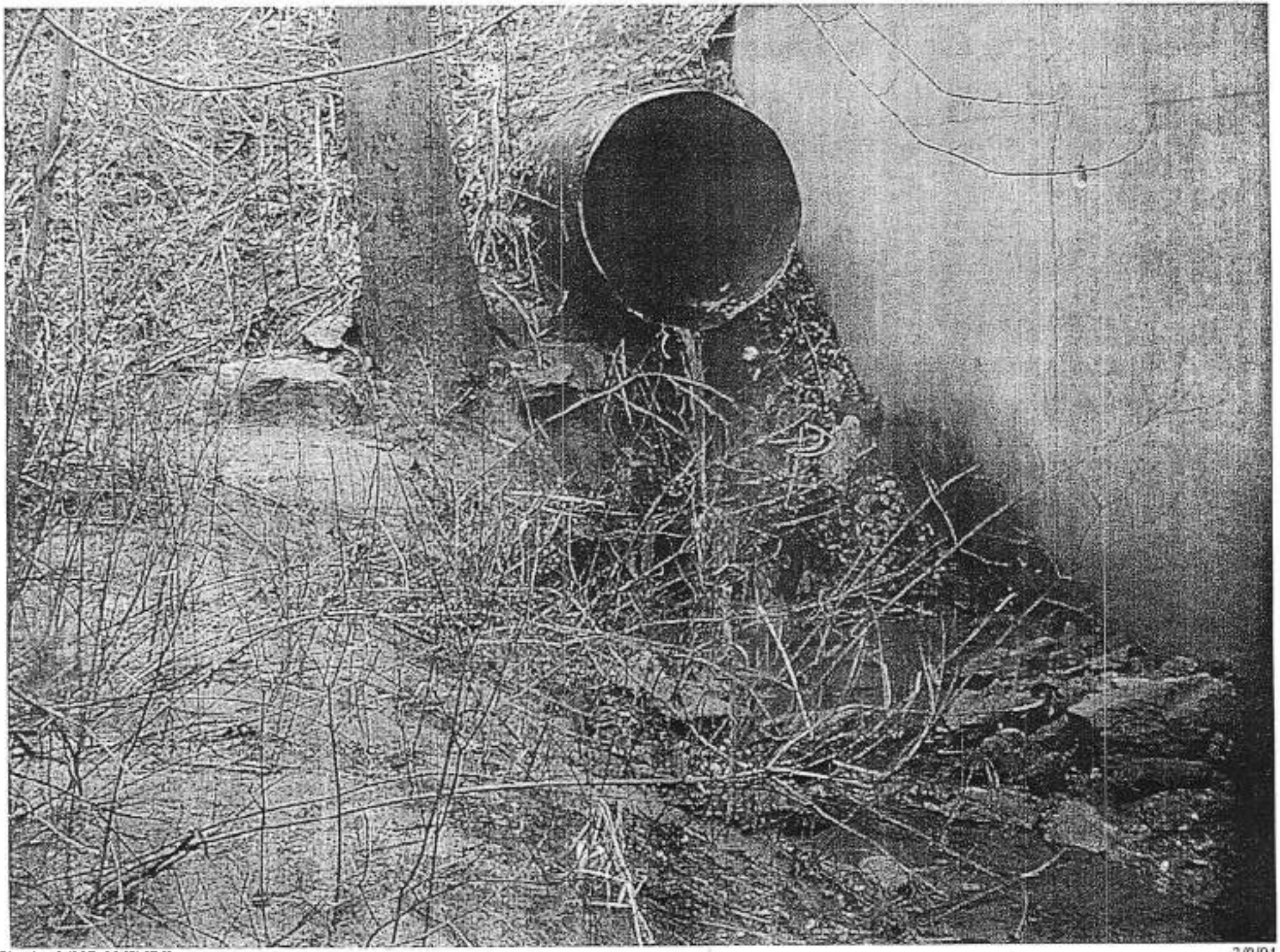




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7/4/04





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3/9/04

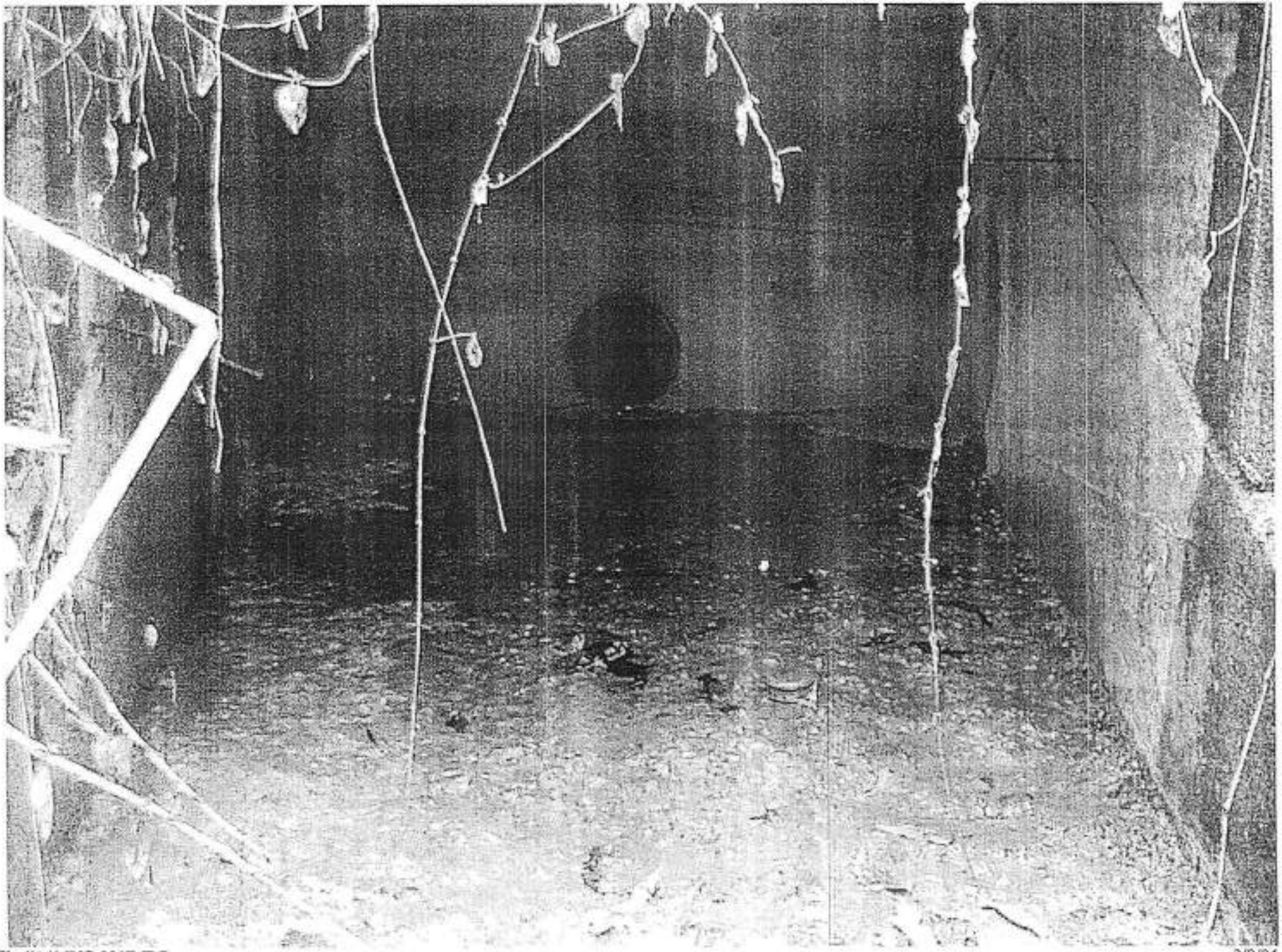


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3/9/04



3/9/04





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Sweetgrass - Pipe scale 1½" Unit 1 - Phase 2 - Column - Section -



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3/9/04

TREDDYFFRIN TOWNSHIP

THE COUNTY OF CHESTER

COMMISSIONERS:
Colin A. Hannit, Chairman
Karen L. Martynick
Andrew E. Dinniman

WILLIAM H. FULTON, AICP
Executive Director

PLANNING COMMISSION
Government Services Center, Suite 270
601 Westtown Road
P.O. Box 2747
West Chester, PA 19380-0990
(610) 344-6285
FAX: (610) 344-6515

BORTON LAWSON LEHIGH VALLEY OFFICE
SRB
PAD
MJW
WSB
PAR
ADMIN
JUL 29 2003
CORRESPONDENCE
AGREEMENT
CONTRACT
PROJECT NO. 2003 137-PC

MEMORANDUM

JULY 28, 2003

TO: Paul DeBarry, Borton Lawson Engineering

FROM: Christina Duff

RE: Crum Creek Act 167 Outfall Mapping

Enclosed please find the outfall mapping for Tredyffrin Township. The Township has provided both a hard copy of the map and the electronic files on CD-Rom. They have not yet completed the Form O; it appears this information will follow later.

Today I spoke with the consultant from Yerkes who is working with Willistown Township to complete their outfall mapping. They are just beginning the process and will not have it completed by July 31st, 2003. Willistown is going to try to complete it as quickly as possible, but does not anticipate being done for at least another month. I have yet to hear from Easttown Township, or Malvern Borough. If we receive any additional mapping or information, we will pass it along to you.

Thanks!

CD/kp
Enclosure

Bill, 7/31/03

Will be receiving data for the Cross Creek Phase II - Since Phase I is now over, Please just make a spreadsheet on excel (from Phase I report) and what data we received (from cover letter) then put in Red file for future reference. No need to put on GIS or Hansen yet.

Thanks
Paul

PAUL-
THERE IS NOTHING ON THIS CD-ROM EXCEPT AN EMPTY APR CALLED 'STORMWATER_FACILITIES.APR' THEY FORGOT ALL THE DATA.
BILL

I HAVE CALL IN TO TROUTFARM TO RESOLVE

BOARD OF SUPERVISORS
TREDYFFRIN TOWNSHIP

Supervisors:
Robert W. Lumina, *Chairman*
Judy J. DiFilippo, *Vice Chairman*
Guy L. Ciarrocchi
Bill DeHaven
Warren E. Kampf
E. Brooks Keffer
Paul W. Olson

CHESTER COUNTY
1100 DuPortail Road
Berwyn, PA 19312-1079

(610) 644-1400 FAX (610) 993-9186
Email: *tredyffrin@tredyffrin.org*
Website: *www.tredyffrin.org*

Joseph A. Janasek
Township Manager

James McErlane PC.
Solicitor

Agreement

Under the Township's licensing agreement with Chester County, the Township may provide a third party consultant with layers from its Geographic Information System (GIS), with the express condition that all data given to the Consultant is returned to the Township and purged from the Consultant's systems at the completion of the project.

On this day, the _____ day of _____, 2004, Delaware County Planning Commission received one CD containing the following six Tredyffrin Township GIS layers.

- Tax Parcels
- Township Boundaries
- Watershed Boundaries
- Stormwater Systems
- Stormwater Pipes
- Streams

I understand and agree to the terms and conditions for using Tredyffrin Township's GIS layers and agree to return the CD and purge the information from all of my equipment and systems at the conclusion of the project.

_____

Delaware County Planning Commission

_____

Stephen F. Norcini
Director of Authority Operations/Asst. Director of Public Works

On this day, the _____ day of _____, 2004, Delaware County Planning Commission returned Tredyffrin Township's GIS information and affirm that all data has been purged from its systems.

_____

Delaware County Planning Commission

_____

Stephen F. Norcini
Director of Authority Operations/Asst. Director of Public Works

CRUM CREEK WATERSHED
ACT 167 STORMWATER MANAGEMENT PLAN

MUNICIPALITY QUESTIONNAIRE

Please fill out the following questionnaire and return it to Karen Holm at the Delaware County Planning Department, Court House and Government Center Building, 201 West Front St. Media, PA 19063 as soon as possible. If you have any questions or comments, or if you would like these forms in digital format, please call Karen at 610-891-5213 or e-mail her at holmk@co.delaware.pa.us

PART I - GENERAL INFORMATION

Municipality: Tredyffrin Township

Contact Person: Stephen F. Norcini

WPAC Designee: Stephen F. Norcini

Title: Director of Municipal Authority Operations

Address: 1100 DuPortail Road
Berwyn Pa 19312

Phone: 610 408 3612

Fax: 610-993-9186 e-mail snorcini@tredyffrin.org

Person Completing form (if different from Contact Person):

Name:

Address:

Phone

Fax:

E-mail:

PART II - REGULATORY ACTIVITIES

A. Please indicate the regulations you currently use to manage development.

REGULATION	MUNICIPAL ORDINANCE	COUNTY ORDINANCE
Zoning Ordinance	✓	
Subdivision/Land Development Ordinance	✓	
Separate Stormwater Ordinance		
Separate Floodplain Ordinance		

B. Please indicate the agencies/individuals who review and approve land development plans and zoning variance/waiver requests.

ENTITY	LAND DEVELOPMENT PLANS		ZONING VARIANCE/WAIVER REQUESTS	
	REVIEW	APPROVE	REVIEW	APPROVE
Supervisors				
Municipal Engineering Department	✓			
Municipal Planning Department	✓	✓	✓	
County Planning Department	✓	-		
County Conservation District	✓	✓		
Zoning Hearing Board			✓	✓
Consulting Engineer	✓			
Others (List Below				

C. Please provide **copies** of your zoning, subdivision/land development, and separate stormwater management and floodplain ordinances and your current zoning map when you return this questionnaire. Please list these documents below:

CD of existing drainage structures
Subdivision and Land Development - Chapter 181 } From the code of the Township of Tredyffrin
Zoning, Chapter 208
Zoning map

PART III - MUNICIPAL AND LOCAL PLANNING ACTIVITIES

Please indicate below whether your community has approved the following plans and maps and the date of the most recent update.

ITEM	APPROVED/DATE	IN PROGRESS	PLANNED WITHIN NEXT YEAR
PA Act 537 Sewage Facilities Plan	✓ 5/93	update	
Comprehensive Land Use Plan			
Existing Land Use Maps	✓		
Proposed Land Use Maps			
Zoning Maps	✓		

PART IV - FLOOD INSURANCE PROGRAM AND COMPREHENSIVE LAND USE PLAN

Please indicate below whether your community participates in the National Flood Insurance Program:

ITEM	PARTICIPATES (Y/N)
Flood Hazard Boundary Map (FHBM)	
Participates in FEMA Emergency Program	
Participates in FEMA Regular Program	

PART V - EXISTING STORMWATER RELATED PROBLEMS AND STRUCTURES

Please complete the matrices on the following pages (Forms A and C-J) to describe any significant stormwater-related problems (Form A), Existing or Proposed Flood Control Projects (Forms C & D), Existing or Proposed Storm Water Control Facilities (Forms E and F), Existing or Proposed Stormwater Collection Systems (Forms G & H), Present and Projected Development in the Flood Hazard Area (Form I), and Water Quality Problem Areas (Form J) that you are aware of in your municipality.

What we would like to ask of you is that you complete as much of the attached data collection forms as possible. There is a different form for each item of information as summarized in the attached "FORM DESCRIPTION SUMMARY The process would be as follows starting with the problem areas (Form A):

- Place the location of the problem area on the map as shown in the attached example map. Draw a box on the map with the problem area identifier starting with A-1 with an arrow leading from the problem area identifier to the problem area.
- Place an A-1 in the first column of FORM A.
- Put a check in each box in the A-1 column that represents the problems associated with that particular problem area.
- Repeat with the next problem area (A-2) and so on.

- Repeat for existing flood control projects (FORM C) placing a triangle on the maps and starting the labeling with C-1.
- Repeat for all forms.

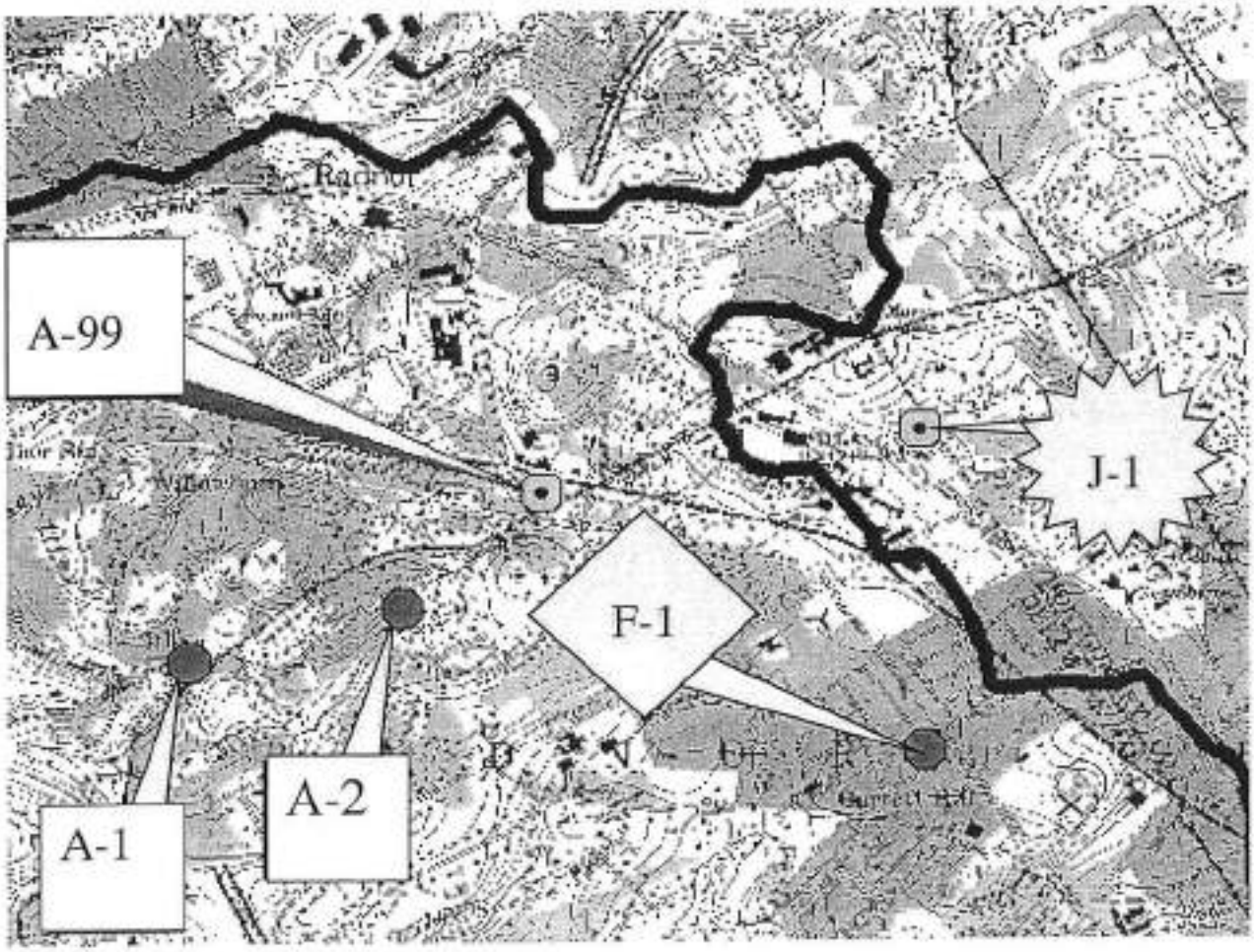
The sample map attached shows three problem areas (A99- A1 and A-2), one proposed flood control project (F-1) and one water quality problem (J1).

Use additional paper to provide detailed descriptions of your most serious problems and attach a map to show the location of the problem. Attach photographs, if available.

If you have any storm or combined sewers, please provide maps showing the collection system and overflow discharge locations and an estimate of the average annual discharge at each overflow point.

The more detail you provide, the better we will be able to evaluate the situation for your municipality. We appreciate your help.

Sample Location of Information from Data Collection Forms on the Municipal Map



* Environmental Protection Agency. Storm and Combined Sewer Program. Vol. I. EPA-625/2-77-004. Washington, D.C. 1977.

STORM WATER PROBLEM AREAS - FORM A sheet 1 of 1

WATERSHED Crum Creek
Name
Municipality Tredyffrin Twp
County: Chester

FORM COMPLETED BY
Name Stephen F. Nateral
Telephone: 610 647 3627
Date: 9/1/04

MAP NO	A-99	A-	A-	A-	A-	A-	A-	A-	A-	A-	A-	A	A-
Types of Storm Water Problems													
Flooding	X												
Accelerated Erosion	X												
Sedimentation													
Landslide													
Groundwater													
Water Pollution	X												
Other (Explain)													
Explanation Line No(s)													
Cause(s)													
Storm Water Volume	X												
Storm Water Velocity	X												
Storm Water Direction	X												
Water Obstruction	X												
Other (Explain)													
Explanation Line No(s)													
Frequency													
Year Most Recent Occurred													
Year First Known to Occur													
Regularity													
More Than 1/Year	X												
Less Than 1/Year													
Only During Ages of Flood													
Duration (If Applicable)													
Less Than One Day	X												
One Day + (Enter Days)													
Property Damages													
Loss of Life / Vital Services													
Private													
More Than One Owner													
Types of Properties													
Undeveloped													
Agriculture													
Residential													
Commercial	X												
Industrial													
Number of Properties													
< 5													
5-10	X												
10+													
Public (List Types)													
Explanation Line No(s)													
Solutions													
Suggested													
Explanation Line No(s)	1												
Formally Proposed													
Explanation Line No(s)													

EXPLANATION LINES

1 I am unaware of any SWM issues in this basin (i.e. flooding,
2
3 erosion, etc.) other than during Floyd.
4

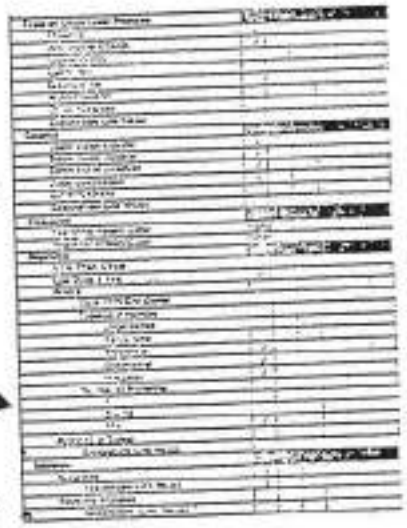
INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (✓) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)." Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.



Use the explanation lines to list the types of public property damages e.g.roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities.

Definitions

Storm Water Problem Area
An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff.

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone.

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstruction
Any dike, bridge, culvert, well, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway or body of water.

EXPLANATION LINES (continued)

FORM E

EXISTING STORM WATER CONTROL FACILITIES FORM E. SHEET _____ OF _____

WATERSHED	FORM COMPLETED BY	DEFINITION
Name: Stony Brook Municipality: Tredyffrin County: Chester	Name: Telephone: 5006 Date: 9/6/04	Storm Water Control Facility A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or area.
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person Name, Address and Phone	Comments
E-	Please see attached GIS map.			
E-				
E-				
E-				
E-				
E-				
E-				
E-				

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin

Natural Pond or Wetland

Parking Lot Ponding

Roof-Top Storage

Semi-Pervious Paving

Infiltration Device (Seepage /

EXISTING STORM WATER COLLECTION FACILITIES FORM G. SHEET _____ OF _____

WATERSHED

Name: Steve Norman

Municipality: TT

County: Chester

FORM COMPLETED BY

Name: Steve

Telephone: 610 405 3623

Date: 4/1/04

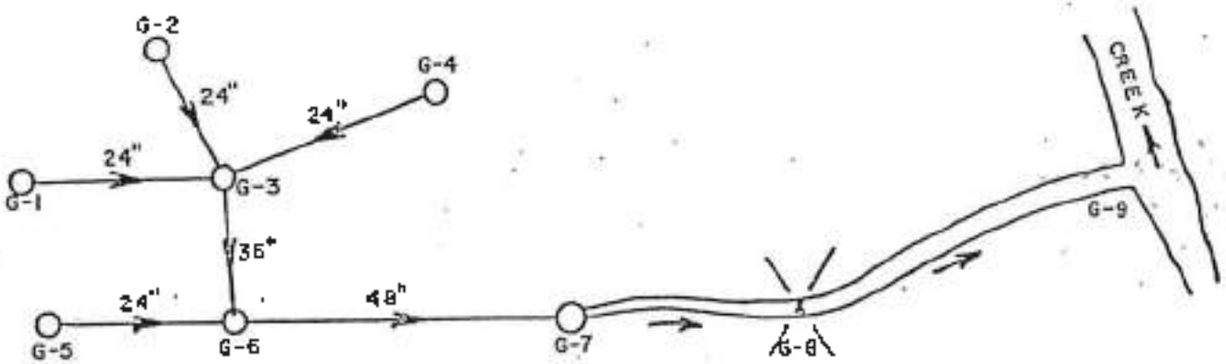
INSTRUCTIONS

Diagram each system on the appropriate map. Establish map points to show changes in system elements, pipe size, or pipe direction. (If unknown, outline the system extent.) Complete this form only where specific information on construction is available. Use a separate form for each system. Identify the points within a system consecutively (ex. G-1,G-2,G-3). Start the first point in each additional system 20 numbers higher. For example, G-3 ends one system, so G-23 begins the next. See Sample Diagrams & Form on Reverse.

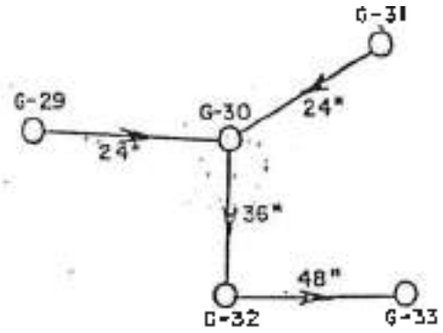
Map I.D No.		System's Elements (x)			Measurements *				Material	Year Constr.	Design Data Available	Contact Person Name and Phone	Name of Final Ownership and Maintenance Responsibility
					Pipe	Channel / Swale							
From	To	Pipe	Open Channel	Swale	D	TW	B	Depth					
G-	G-												
G-	G-	Please see attached GIS map											
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												
G-	G-												

* See measurement key on reverse side.

Measurement Key
D = Diameter
TW = Top Width
B = Bottom Width

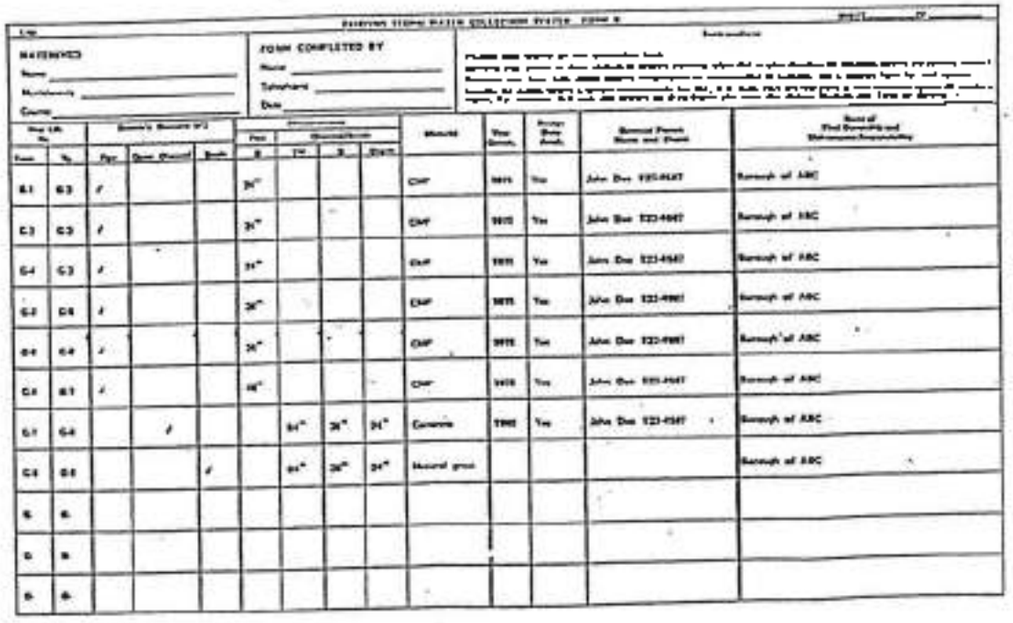


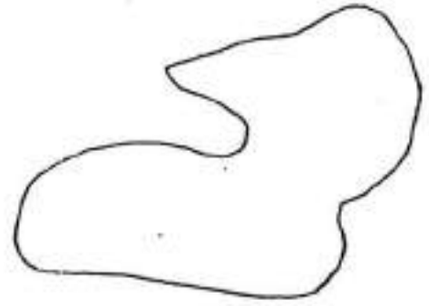
SAMPLE DIAGRAM FOR SYSTEM ONE



SAMPLE DIAGRAM FOR SYSTEM TWO

SAMPLE FORM (System One Only)





Outline known areas where construction exists but construction data is unavailable.

WATER QUALITY PROBLEM AREAS (FORM J)

Watershed
Name: Crum Creek
Municipality: Tredyffrin
County: Chester

Form Completed By
Name: Stephen F. Norman
Telephone: 610 408 3623
Date: 9/1/04

Site:	J- 1	J-	J-	J-	J-	J-	J-	J-
Types of Water Quality Problems								
High Community Tolerance								
High Temperature								
High Turbidity								
Hydrocarbon Pollution								
Low Community Diversity								
Low Dissolved Oxygen								
Low pH								
Nutrient Enrichment								
Poor Habitat								
Other / Explanation Line No.	✓							
Potential Causes(s)								
Agriculture								
Construction Site								
Erosion								
Lake Discharge								
STP Outfall								
Other / Explanation Line No.								
Frequency								
Year Most Recent Occurrence								
Year First Known Occurrence								
Source of Information								
Streamwatch								
County Water Quality Study								
Driveby								
CCD Complaint Investigation								
Other / Explanation Line No	✓							

Explanation Lines
1. Resident complaint - "foam" in creek - DEP + CCCD notified.
2.
3.

P:\99610\01\Data\Form J

UPPER PROVIDENCE TOWNSHIP

DCPD

DELAWARE COUNTY PLANNING DEPARTMENT

Court House/ Government Center , 201 W. Front St., Media PA 19063
Office Location: Total Building, 2nd & Orange Sts., Media, PA 19063
Phone: (610) 891-5200 FAX: (610) 891-5203
E-mail: planning_department@co.delaware.pa.us

TO: Bill Brokaw

FROM: Christopher Gallagher

DATE: 11/1/05

RE: Crum Creek Stormwater Management Plan
Upper Providence and Nether Providence Forms

Bill,

Please find attached Forms A and C and map from Upper Providence Township and Form O and Storm Sewer Map from Nether Providence Township

If you require any additional information, please do not hesitate to contact me at (610)-891-5130.

BORTON LAWSON LEHIGH VALLEY OFFICE
BRB
PAD
MJW
WSB
PAR
ADMIN
NOV 2 1 2005
CORRESPONDENCE
AGREEMENT
CONTRACT
PROJECT NO.

Form A

STORM WATER PROBLEM AREAS FORM A. SHEET 1 OF

WATERSHED		FORM COMPLETED BY		Before Filling Out Form, See Instructions On Back
Name:	Drury Block	Name:	Anthony Hannon	
Municipality:	Upper Providence	Telephone:	610 565 4940	For County Use:
County:	Delaware	Date:	6/15/05	

MAP NO. *	A-1	A-2	A-3	A-	A-	A-	A-	A-	A-	A-	A-	A-
Types of Storm Water Problems												
Flooding	✓	✓	✓									
Accelerated Erosion		✓										
Sedimentation												
Landslide												
Groundwater												
Water Pollution												
Other (Explain)												
Explanation Line No. (On Back)												
Cause (s)			✓									
Storm Water Volume	✓	✓	✓									
Storm Water Velocity												
Storm Water Direction		✓										
Water Obstruction												
Other (Explain)												
Explanation Line No. (On Back)												
Frequency												
Year Most Recent Occurred	2005	2006	2006									
Year First Known Occurred	?	?										
Regularity			✓									
More Than 1 Year	✓	✓	✓									
Less Than 1 Year												
Only During Agnes												
Duration (If Applicable)												
Less Than 1 Day	✓											
1 Day + (Enter Days)		✓	✓									
Property Damage												
Loss of Life/Vital Services												
Private	✓	✓	✓									
More Than One Owner		✓										
Types of Properties		✓										
Number of Properties		3										
Public (List Types)	✓	✓	✓									
Explanation Line No. (On Back)												
Solutions												
Suggested												
Explanation Line No. (On Back)												
Formally Proposed		✓										
Explanation Line No. (On Back)												

* Include Map ID No. if found on any other form listing proposed facilities.

INSTRUCTIONS

Begin with A-1 as the first map number to identify the first storm water problem area. Illustrate the defined problem on the watershed map provided, and identify it with its map number.

For each storm water problem area within your municipality, enter the map identification number at the head of the column. Describe the problem by placing a check (√) in the appropriate blocks of the column under this map identification number.

When an additional explanation is required, write the line number(s) used in the column marked "Explanation Line No. (s)".Example 1, 2-3, etc.

If storm water problem occurred during and after Agnes, describe the frequency of the problem after Agnes.

Use the explanation lines to list the types of public property damages ,e.g roadways, hospitals, etc.

Enter the line no. (s) used to list the map ID no. (s) for the proposed facilities.



Definitions

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An area that defines the farthest extent of a storm water problem, including any area that experiences property damage, inundation, accelerated erosion, surface water pollution, groundwater pollution, landslides, or any other problem as a result of storm water runoff

Groundwater
Water in the ground below the water table.

Accelerated Erosion
The removal of the surface of the land through the combined action of man's activities and the natural processes at a rate greater than would occur because of the natural process alone

Sedimentation
The process by which soil or other surface materials, transported by surface water, is deposited on stream bottoms.

Water Obstructions
Any dike, dredge, culvert, wall, wingwall, fill, pier, wharf, embankment, abutment, or other structure located in, along, across, or projecting into any watercourse, floodway, or body of water

EXPLANATION LINES (continued)

Upper Providence (UPP)

SHEET 7 OF 15

FORM B - OBSTRUCTION DATA COLLECTION

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Upper Providence / Chester

Records completed by: Kevin Beard

Field work personnel: _____

Date(s): 12/1 - 12/20/24

T= Amount of fill
D= Diameter
HT = Height
W = Width
PW = Pier Width

Material
masy = Stone Masonry Structure
CMP = Corrugated Metal Pipe
CPP = Corrugated Polyethylene Pipe
BCMP = Bituminous Coated CMP
RCP = Reinforced Concrete Pipe
SP = Steel Pipe
HW = Headwall
WW = Wingwall
SW = Sidewall

Inlet Conditions

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Bridge ⌒	Bridge ⊓	Measurements: T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
UPP1	Providence Rd/Painters Dr		1				✓				2.3					90	RCP/HW	GPS MEW27
UPP2	Providence Rd/Painters Dr		1				✓				1.3					90	RCP/HW	GPS MEW28
UPP3	115 ↑		1				✓				2.5					90	CMP	GPS MEW29
UPP4	111 ↑		1				✓				2					90	CMP	GPS MEW30
UPP5	Providence Rd/Rose Valley		1				✓				3					90	CMP	GPS MEW31
UPP6	Providence Rd/Rose Valley		1					✓			13		5	6.5		90	CMP HW+WW	Inlet Severely Clogged
UPP7	Providence Rd/Rose Valley		1					✓			4.5					90		GPS MEW32
UPP8	Providence Rd/Rose Valley		1					✓			5					90		
UPP9	Providence Rd/Rose Valley		1					✓			10		14	34.9	3	90	MSL W	
UPP10	Providence Rd/Rose Valley		1	✓				✓			3		10	20		90		
UPP11	Providence Rd/Rose Valley		1				✓				3					90	RCP1 HW	
UPP12	Providence Rd/Rose Valley		1				✓				3					90		
UPP13	Providence Rd/Rose Valley		1				✓				3					90		
UPP14	Providence Rd/Rose Valley		1				✓				2.5					90		
UPP15	Providence Rd/Rose Valley		1				✓				3					90		
UPP16	Providence Rd/Rose Valley		1				✓				3					90		
UPP17	Providence Rd/Rose Valley		1				✓				4.5					90		
UPP18	Providence Rd/Rose Valley		1				✓				3					90		
UPP19	Providence Rd/Rose Valley		1				✓				4.5					90		
UPP20	Providence Rd/Rose Valley		1				✓				3					90		
UPP21	Providence Rd/Rose Valley		1				✓				4.5					90		
UPP22	Providence Rd/Rose Valley		1				✓				3					90		
UPP23	Providence Rd/Rose Valley		1				✓				4.5	4.5				90	LEP HW	
UPP24	Providence Rd/Rose Valley		1				✓				4.5	2				90	Corrugated/HW	

#UPP12, UPP13 were in. maple. - UPP14-UPP.24 were relabeled to UPP12 - UPP022

FORM C

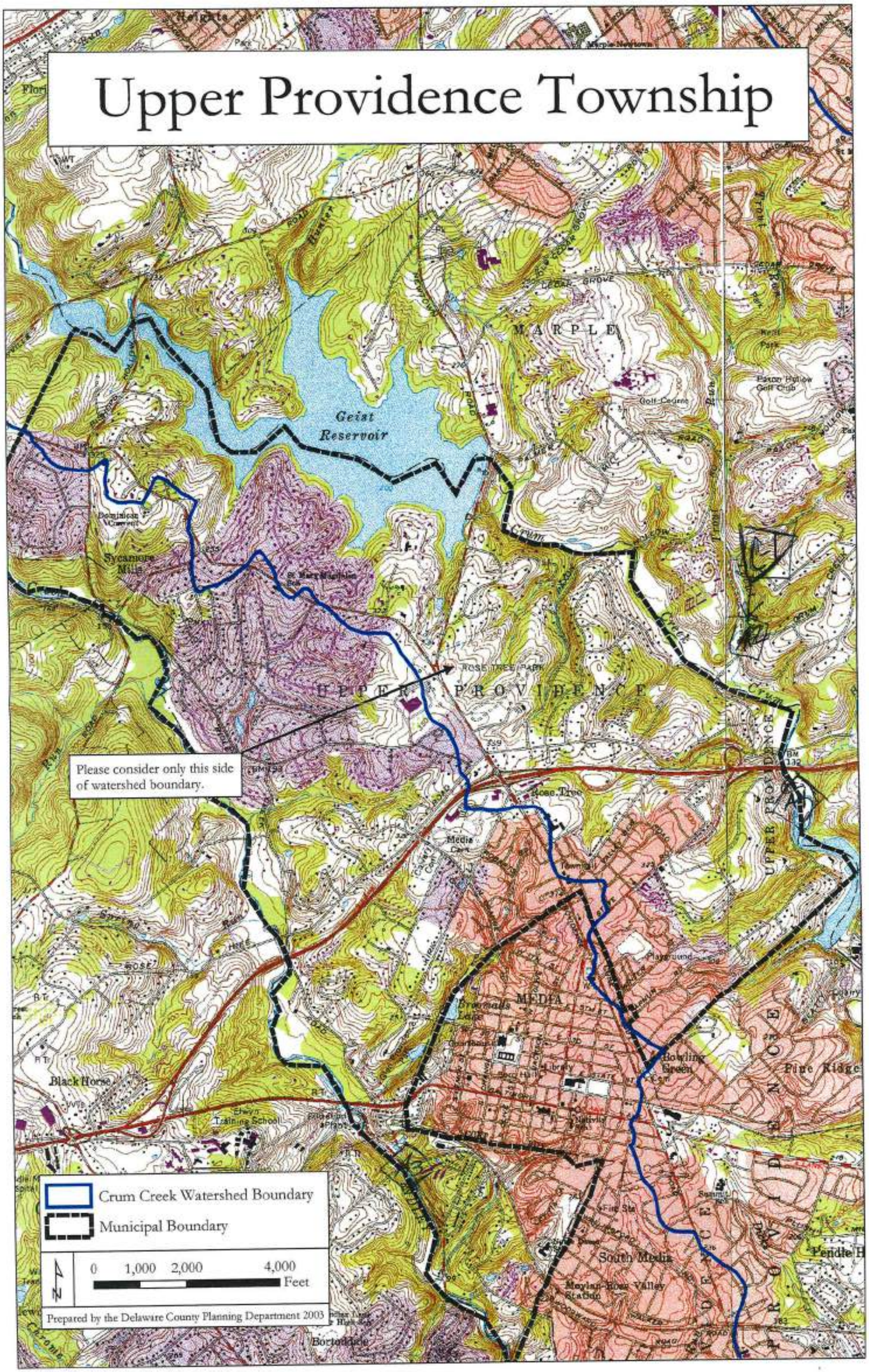
EXISTING FLOOD CONTROL PROJECT FORM C. SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	TYPICAL TYPES OF FLOOD CONTROL PROJECTS		
Name: Crum Creek	Name: Anthony Hamada	Channel Excavation / Widening	Levee	Dams
Municipality: Upper Providence	Telephone:	Channel Realignment	Gabions	Floodwall
County: Delaware	Date:	Rock Riprap	Pipe Channel	Concrete Lining

For County Use:

Map ID No.	Type of Flood Control Project	Year Constr Built	Expected Life Yrs.	Design Flood Frequency Yrs.	Design Flood Discharge C.F.S. (if known)	Owner Name, Address, and Phone
C-1	HANSELL BRIDGE RECONSTRUCTION	?	?	?		Delaware County
C-						
C-						
C-						
C-						

Upper Providence Township



WILLISTOWN TOWNSHIP

Willistown

FORM B - OBSTRUCTION DATA COLLECTION SHEET 2 OF 15

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: Willistown / Chester

Records completed by: Brian Bruno

Field work personnel: _____

Date(s): 12/1 - 12/20/04

T= Amount of fill
D= Diameter
HT = Height
W = Width
PW = Pier Width

Material: stpry = Stone Masonry Structure; CMP = Corrugated Metal Pipe; CPP = Corrugated Polyethylene Pipe; RCMP = Bituminous Coated CMP; RCP = Reinforced Concrete Pipe; SP = Steel Pipe

Inlet Conditions: HW = Headwall; WW = Wingwall; SW = Skewed

Map ID.	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Bridge ∩	Bridge ⊓	T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
W-1	Rt 30		1				✓				1.9	2.5				45	SP / HW	
W-2	Dorm Rd (downstream)		1					✓			2.5	—	H	10	—	90	RCMP / HW, WW	Replace w/ new culvert
W-3	Hall (upstream)		1	✓					✓		2.5	—	H				MSW	
W-4	Dorm Rd (downstream)		1			✓					2.5	—	5.25	7.5	—	90	MSW / HW	
W-5	Farm Lane (upstream)		1				✓				1	5	—	—	—	90	RCP / HW, WW	Closed
W-6	Equestrian Ctr		1				✓				1	5	—	—	—	90	RCP / HW, WW	
W-7	Martin Dr		1					✓			1	—	3.5	5	—	90	RCP / HW, WW	
W-8	Dorlan Rd (upstream)		1				✓				1	4	—	—	—	90	CPP	
W-9	Ridley Creek State Park		1				✓				1	5	—	—	—	90	RCP / HW, WW	
W-10	Abbey Rd		1			✓					3	—	3	6	—	90	MSW / ITW, WW	
W-11	Garden		1	✓						✓	1.5	—	4	10	—	90	MSW	
W-12	Garden Rd (upstream)		1	✓						✓	1.75	—	4	9	—	90	MSW / HW, WW	
W-13	Colonial Lane		1				✓				2	—	3	4.5	—	90	CPP / HW, WW	
W-14	Rt 30 (downstream)		1	✓						✓	2.25	—	3.75	5	—	90	MSW / HW	Small Intermittent
W-15	Park		1	✓						✓	2.5	—	3.5	5	—	90	MSW / HW, WW	
W-16	Malvern Overflow		1				✓				2	—	4.5	6	—	90	RCP / HW, WW	
W-17	Rt 30		1															NO ASST.
W-18	Walnut Hill		1			✓					2	—	4	10	—	90	RCP / HW, WW	
W-19	Rt 30 (upstream)		1				✓				2	5				90	RCP	
W-20	" "		1				✓				2	5				90	RCP	
W-21	Lone Lane		1					✓			1.5	—	3	5	—	90	CMP / HW	2 Pipes
W-22	Forest Lane		2				✓				1.5	—	2.3	4	—	90		
W-23	Elephant Lane		1				✓				1.5	4.5	—	—	—	90	RCP / HW, WW	
W-24	Rt 30 (upstream)		1				✓				2.5	2.5	—	—	—	90	RCP / HW, WW	
W-25	Ranch		1			✓					2	—	3	10	—	90	W Stn / HW, WW	
W-26	Riverview Farm Lane		1					✓			2	—	3.75	4.5	—	90	CMP / HW, WW	
W-27	Sunset Lane		1					✓			1.5	—	3	4.5	—	90	CMP	Bank Stabilization
W-28	Rt 30		1				✓				1.5	2.75	—	—	—	90	RCP	Bank Stabilization
W-29	Rt 30		1				✓				2.75	—	—	—	—	90	CMP	
W-30	Rt 30		1					✓			2	—	3.5	5	—	90	CMP	
W-31	Rt 30		2					✓			0.5	—	4	6	—	90	CMP	2 Pipes (Main Channel)
W-32	Rt 30		1				J				1.5	—	3	—	—	90		
W-33	Rt 30		2				✓				2	—	4	6	—	90	CMP	Main Channel
W-34	Rt 30		1				✓				2	—	3	6	—	90	CMP	
W-35	Rt 30		1	✓						✓	2	—	4	16.5	—	45	MSW	

* W-1 was skipped, W-2 - 76 were renamed to W-1 - 75

Willistown (WIL)

FORM B - OBSTRUCTION DATA COLLECTION

SHEET _____ OF ___

Municipal Stream Obstruction Data

Records compiled by: Brian Bruno

Watershed: Crum Creek

Field work performed: _____

Municipality/County: Willistown/Chester

Date(s): 12/1 - 12/30/04

Map ID	Owner or Address Of Obstruction	Capacity (CFS)	Num. of	Opening Type: Part of Roadway	Opening Type: Culvert Opening	Opening Shape (✓): Culvert: □	Culvert: ○	Culvert: ⬭	Bridge: ⌒	Bridge: □	Measurements: T (in)	E (ft)	HT (ft)	W (ft)	PW (ft)	Stone units	MATERIAL / INLET CONDITION	NOTES

WJL

FORM B - OBSTRUCTION DATA COLLECTION

SHEET 13 OF _____

Municipal Stream Obstruction Data

Watershed: Crum Creek

Municipality/County: W. Whiteland / Chester

Records completed by: Brian Rund

Field work personnel: _____

Date(s): 12/1 - 12/20/04

Ta Amount of fill	Material		Inlet Conditions
Da Diameter	mary = Stone Masonry Structure		HW = Headwall
HT = Height	CMP = Corrugated Metal Pipe		WW = Wingwall
W = Width	CPP = Corrugated Polyethylene Pipe		SW = Sidewall
PW = Pier Width	SCCMP = Bituminous Coated CMP		
	RCP = Reinforced Concrete Pipe		
	SP = Steel Pipe		

Map ID.	Owner or Address Of Obstruction	Capacity (CFS)	Nos. of?	Opening Type: Part of Bridge?	Opening Type: Culvert Purpose	Opening Shape (✓): Culvert □	Culvert ○	Culvert ⬭	Bridge ⌒	Bridge □	T (ft)	D (ft)	HT (ft)	W (ft)	PW (ft)	skew angle	MATERIAL / INLET CONDITION	NOTES
WJL 70	Lucia Road #3		1				✓				1	1½	—	—	—	90		
WJL 71	Lucia Road #2		1				✓				1½	1½	—	—	—	90		NO CHANGE
WJL 72	Lucia Road #1		1				✓				1½	1½	—	—	—	90		
WJL 73	Lucia Road #4		1				✓				2	1½	—	—	—	90		
WJL 74	Lucia Road #5		1	✓						✓	3½	—	8	6½	—	90		
WJL 75	Lucia Road #6		1	✓						✓	4½	—	8	6½	—	90		
WJL 76	Lucia Road #7		1				✓				2.2	2½	—	—	—	90		NO CHANGE
WJL 77																		

Form O - Outfall Data

Person: Dave Edge Date: 12-12-03 Time Since Last Rain was > 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: Crum

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae in sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
1	1	yes	9:45	18	0	52	66		NO	NO	Res	0
2	2	Yes	10:00	61	7½	46	72		yes	NO	Res	0
3	3	yes	10:15	18	0	31	36		yes	NO	Res	0
4	4	yes	10:30	18	0	24	42		NO	NO	Res	0
5 5	5	yes	10:30	Swale	0	48	84		NO	NO	Res	0
6 6	6	yes	10:30	Swale	0	36	30		NO	NO	Res	0
7	7	yes	10:35	12	0	20	48		NO	NO	Res	0
8	8	yes	10:45	11x24	0	72	84		NO	NO	Res	0
9	9	yes	10:50	18	0	36	48		NO	NO	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 10-20-05 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: Crum

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area. R	Rating (0-2)
10	10	yes	11:00	28x21	0	72	108		no	0	Res	0
10	11	yes	11:06	38x21	0	72	108		no	0	Res	0
11	12	yes	11:15	Swale	0	6	36		no	0	Res	1
11	13	yes	11:15	Swale	0	6	36		no	0	Res	1
12	14	yes	11:20	Swale	0	6	36		no	0	Res	0
12	15	yes	11:20	Swale	0	6	36		no	0	Res	0
13	16	yes	11:30	20x15					no	0	Res	0
	17	yes	11:30	Swale		10	36		no	0	Res	0
	18	yes	11:30	Swale		10	36		no	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches; > 0.1 inches Days Since Last Rain 4

Municipality: Wilkstown Twp Name of receiving water: Dam

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
13	19	yes	11:30	18x21	0	—			0	0	Res	0
14	20	yes	11:40	19x20	0	—			0	0	Res	0
	21	yes	11:40	19x20	0	—			0	0	Res	0
				Swale	0	—	2ft		0	0	Res	0
				Swale	0	—	2ftx6		0	0	Res	0
15	22		11:45	10x24								
	23		11:45	Swale			2ftx6					
	24		11:45	10x24								
	25		11:45	Swale			2ftx6					

↑ 7

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*H:I = Vertical rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 5+

Municipality: Willis Town Twp Name of receiving water: Drum

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-3)
16	26	Yes	1:10	7x24	0	—	120		no	0	Res	0
	27	Yes	1:10	12x24	0	—	120		no	0	Res	0
17	[redacted]	Yes	1:15	10	2	12	49		yes	0	Res	0
18	28	Yes	1:30	24/15	6	72	84		yes	0	Res	0
19	38	Yes	1:35	15	9	32	66		yes	0	Res	0
20	30	Yes	1:45	24x24	2	48	84		yes	0	Farm	0
21	31	Yes	1:50		20	48	84		yes	0	Res	2
22	33	Yes	2:00	15	0	39	—	—	no	0	Res	0
23	34	Yes	2:05	15	0	30'	50'		no	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs recording (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: Crum

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
24	35	yes	2:10	Swale	0	8	48		NO	0	Farm	0
25	36	yes	2:15	Swale	0	—	—		NO	0	Farm	0
26	37	yes	2:25	15x19	0	44	—		NO	0	Farm	0
27	38	yes	2:30	16	0	28	64		NO	0	Res	0
	39	yes	2:30	Swale	0	30	72		NO	0	Res	0
28	40	yes	2:50	19x36	1	50	108		yes	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-07 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: Crum

Pipe/Swale #	Photo #	Storm Drain? Yes/No/Not Sure	Time (HH:MM) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area.	Rating (0-2)
1	1	yes	9:45	18	0	52	66		NO	NO	Res	0
2	2	yes	10:00	61	7½	46	72		yes	NO	Res	0
3	3	yes	10:15	18	0	31	36		yes	NO	Res	0
4	4	yes	10:30	18	0	24	42		NO	NO	Res	0
5 5	5	yes	10:30	Swale	0	48	84		NO	NO	Res	0
5 6	6	yes	10:30	Swale	0	36	30		NO	NO	Res	0
7	7	yes	10:35	12	0	20	48		NO	NO	Res	0
8	8	yes	10:45	11×24	0	72	84		NO	NO	Res	0
9	9	yes	10:50	18	0	36	48		NO	NO	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*H:V = Vertical : rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-13 Time Since Last Rain was > 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: Crum

Pipe Sample #	Photo #	Storm Drain? Yes/No Nox Sale	Time (00:00 am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area. R	Rating (0-2)
10	10	Yes	11:00	38x21	0	72	108		No	0	Res	0
10	11	Yes	11:00	38x21	0	72	108		No	0	Res	0
11	12	Yes	11:15	Swale	0	6	36		No	0	Res	1
11	13	Yes	11:15	Swale	0	6	36		No	0	Res	1
12	14	Yes	11:20	Swale	0	6	36		No	0	Res	0
12	15	Yes	11:20	Swale	0	6	36		No	0	Res	0
13	16	Yes	11:30	28x16					No	0	Res	0
	17	Yes	11:30	Swale		10	36		No	0	Res	0
	18	Yes	11:30	Swale		10	36		No	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*E:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain: < 0.1 inches. > 0.1 inches Days Since Last Rain 4

Municipality: Wellsboro Twp Name of receiving water: Corn

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (HH:MM) a.m./p.m.	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes - no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
13	19	Yes	11:30	18x21	0	—			0	0	Res	0
14	20	Yes	11:40	19x20	0	—			0	0	Res	0
	21	Yes	11:40	19x20	0	—			0	0	Res	0
				Swale	0	—	24x6		0	0	Res	0
				Swale	0	—	24x6		0	0	Res	0
15	22		11:45	10x24								
	23		11:45	Swale			24x6					
	24		11:45	10x24								
	25		11:45	Swale			24x6					

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odor, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H/V = Horizontal to vertical ratio

*V = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes V

Quantity of Last Rain: < 0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willis Town Twp Name of receiving water: CBUM

Pipe Swale #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use or upstream drainage area	Rating (0-2)
16	26	Yes	1:10	9x24	0	—	120		NO	0	Res	0
	27	Yes	1:10	12x24	0	—	120		no	0	Res	0
17	28	Yes	1:15	10	2	12	48		yes	0	Res	0
18	29	Yes	1:30	24/15	6	72	84		yes	0	Res	0
19	30	Yes	1:35	15	9	32	66		yes	0	Res	0
20	31	yes	1:45	24x34	2	48	84		yes	0	FARM	0
21	32	Yes	1:50		20	48	84		yes	0	Res	2
22	33	Yes	2:00	15	0	39	—	—	no	0	Res	0
23	34	Yes	2:05	15	0	30'	50'		NO	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate scouring or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

Form O - Outfall Data

Person: Dave Edge Date: 12-22-03 Time Since Last Rain was ≥ 72 Hours: Yes ✓

Quantity of Last Rain <0.1 inches: > 0.1 inches Days Since Last Rain 4

Municipality: Willistown Twp Name of receiving water: CREEK

Pipe Work #	Photo #	Storm Drain? Yes/No Not sure	Time (00:00) am/pm	Pipe Diameter (inches)	Depth of flow in pipe (feet)	Channel Depth	Channel Bottom Width (feet)	Channel Side Slopes* (H:V)	Flow Observed (Yes or no)	Water Color/Odor (specify if floatables, algae or sediment present)	Describe land use of upstream drainage area	Rating (0-2)
24	35	yes	2:10	Swale	0	8	48		no	0	Farm	0
25	36	yes	2:15	Swale	0	—	—		no	0	Farm	0
26	37	yes	2:25	15x19	0	44	—		no	0	Farm	0
27	38	yes	2:30	16	0	28	64		no	0	Res	0
	39	yes	2:30	Swale	0	30	72		no	0	Res	0
28	40	yes	2:50	19x36	1	50	108		yes	0	Res	0

Rating System:

0=No observed impairment (No dry weather flow, no solids, floatables or debris, no erosion or sediment, pipe in good repair)

1=Needs rechecking (some dry weather flow, moderate staining or sediment deposition, some floatables or debris, odor, algae, pipe in poor condition)

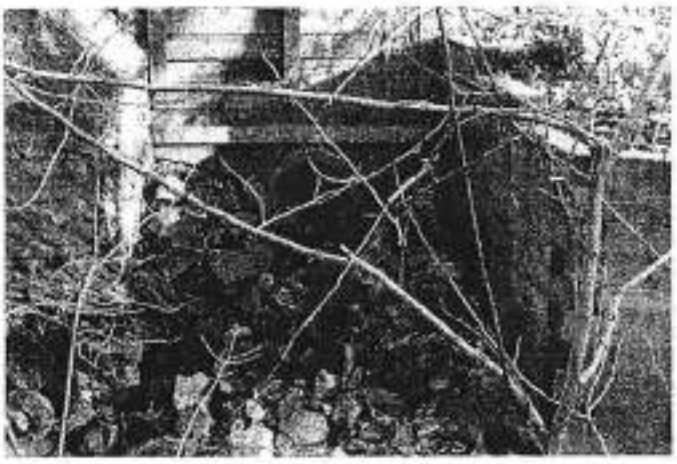
2=Impairment - needs investigation (flow exhibiting odors, foam, solids, turbidity or oil sheen, considerable sediment deposition, algae or debris, pipe collapsed or crumbling, blocked catch basins or drain)

H:V = Horizontal to vertical ratio

*1:1 = Vertical - rectangular channel

NOTES:

1



2



3



4



5



6



7



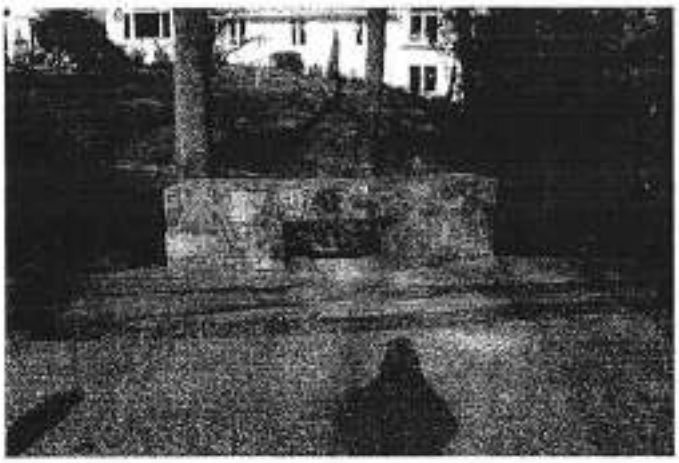
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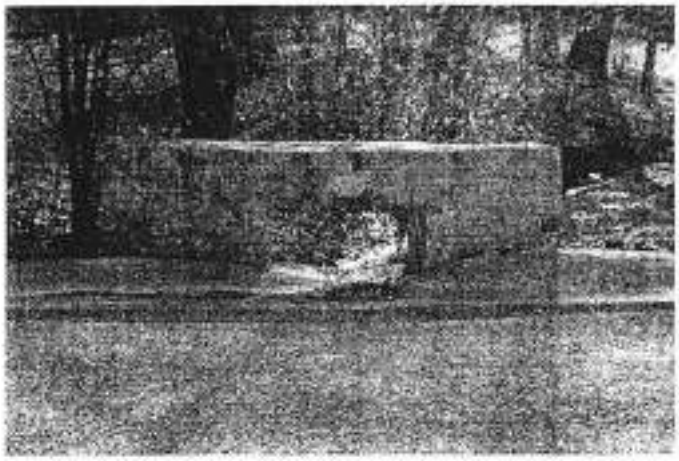
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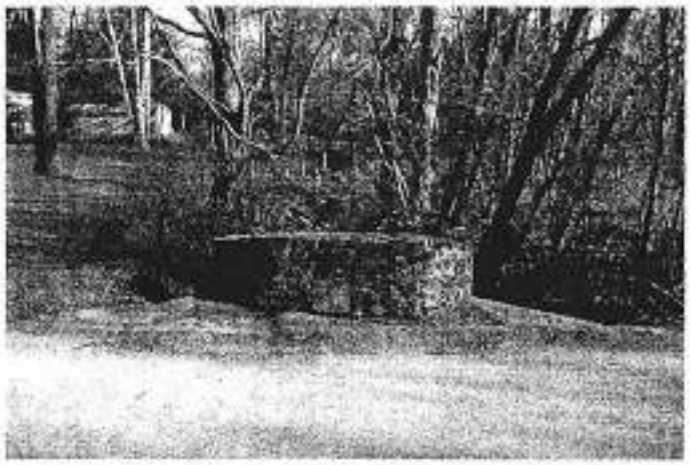
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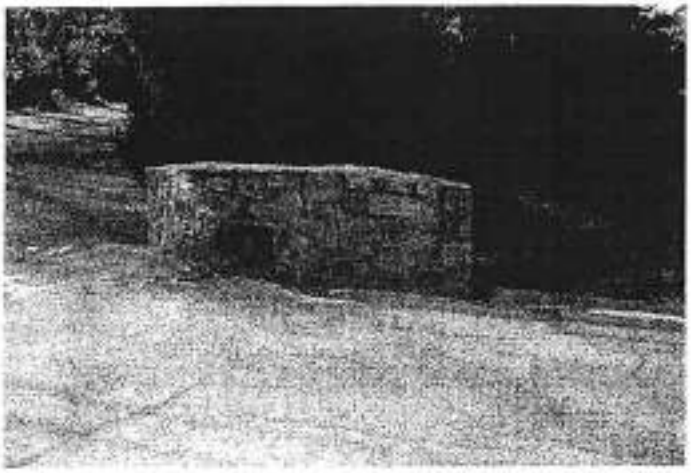
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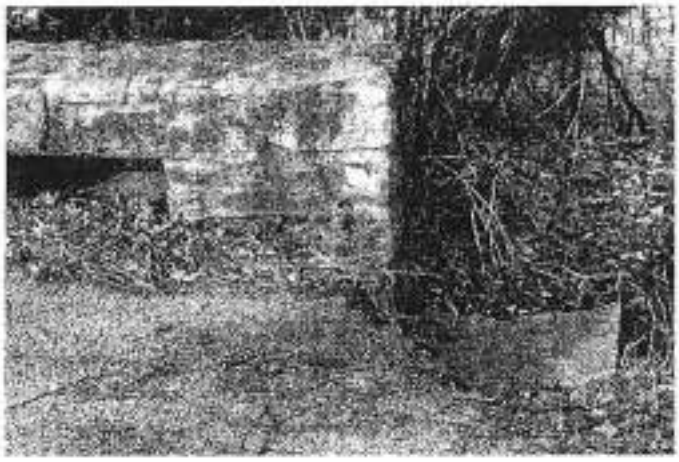
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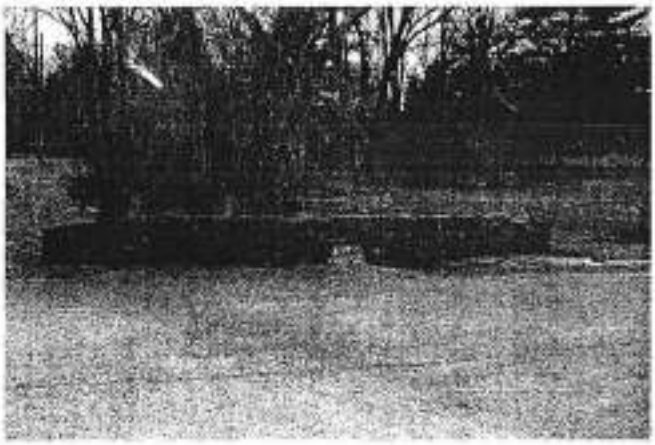
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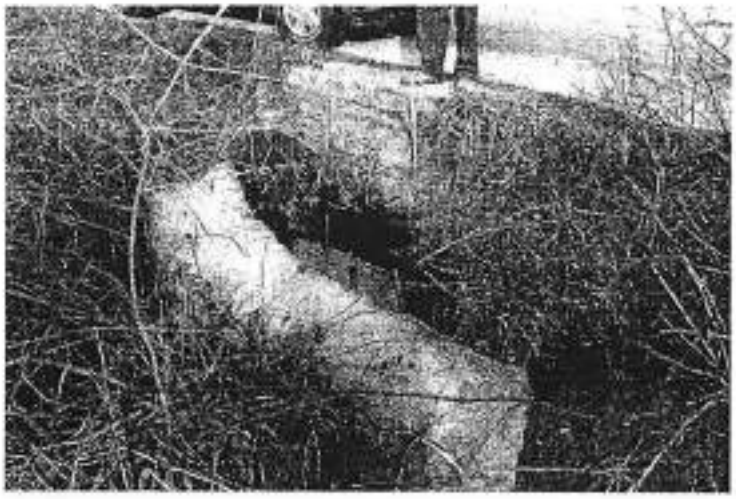
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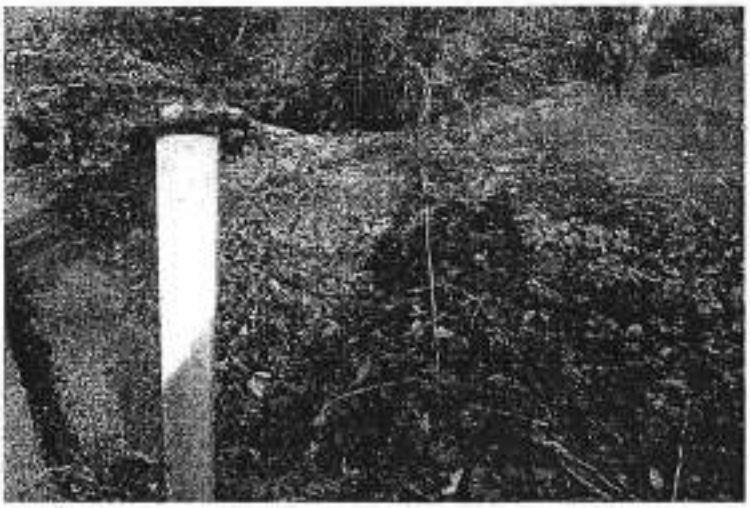
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FORM E - EXISTING STORM WATER CONTROL FACILITIES SHEET 1 OF 1

WATERSHED	FORM COMPLETED BY	Definition of Storm Water Control Facility
Name: Crum Creek	Name: Brian Bruno	A natural / man-made device or structure specifically designed and / or utilized to reduce the rate and / or volume of storm water runoff from a site or sites.
Municipality:	Telephone:	
County: Delaware	Date: 11/04 - 12/2004	
For County Use:		

Map ID No.	Type of Storm Water Control Facility	Year Built	Contact Person	Address and Phone	Comments
E- 1	Detention Pond	2003	(illegible)	Spring Lake Village	
E- 2	Detention Pond	Never built	(illegible)	Kenmore Communities	Grading on Tennent Hill
E- 3	Detention Pond	" "	(illegible)	Woodchuck Farms	Small upscale housing development
E- 4	Detention Pond	" "	(illegible)	The village of Newtown	Newtown Sq Sugartown Rd
E- 5	" "	" "	(illegible)	The Lorenzo Corporation / Bryan	Development off Goshen Rd (Rt 352)
E- 6	" "	" "	(illegible)	Windsor Inn off 252 North	
E- 7	" "	" "	(illegible)	Stony Brook Lane	Springton Point Estates
E- 8	" "	" "	(illegible)	Residence / Saddle Run	
E- 9	" "	" "	(illegible)	Newtown Sq off Route 252	Indian Springs Estates
E- 10	" "	?	(illegible)	Rt 1 P. along Darby Run NP	
E- 11	" "	Never built	(illegible)	Dunwoody Complex off Rt 3	
E- 12	Detention / Sedimentation Basin	2004 ?	(illegible)	Eyrefield Drive / Troop Farm Rd off 252	New Development / Several Ponds
E- 13	" " Basin	2004 ?	(illegible)	Sanatoga Road off 252	" "
E- 14	Detention Pond	" "	(illegible)	Buck Hill / Harvard Ln	" "
E- 15	" "	" "	(illegible)	Covenant Church off 320	New Hospital
E-					
E-					
E-					
E-					
E-					
E-					

TYPICAL TYPES OF STORM WATER CONTROL FACILITIES

Detention / Retention Basin	Roof-Top Storage
Natural Pond or Wetland	Semi-Pervious Paving
Parking Lot Ponding	Infiltration Device (Seepage /Recharge Basin or Underground Tank)

MARPLE (3) (illegible) CONCORD (illegible) NEWTOWN (5) (illegible) (2)
(illegible) THORNBURY (1) SPRINGFIELD (1)

E. INFILL - REDEVELOPMENT CRITERIA

APPENDIX E

INFILL - REDEVELOPMENT CRITERIA

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I. INTRODUCTION

The following is an investigation into methods employed by various municipalities across the nation to address the issue of stormwater management in areas of redevelopment or infill. Ordinances were reviewed from the states of Maryland and Georgia as well as ordinances from the cities of Seattle, WA and Portland, OR and the Chester Creek Watershed in Delaware County, PA. These ordinances were reviewed to determine if there is a consensus on how stormwater runoff from redeveloping areas should be addressed from a water quantity and quality perspective.

II. SUMMARY

The five ordinances reviewed varied significantly in the way stormwater issues were addressed. A brief summary of the stormwater quantity and quality criteria from each ordinance is included in the paragraphs below.

1. Maryland

Runoff Quantity Controls

There are no specific criteria to be met within the ordinance to address recharge, channel protection storage volumes or overbank flood protection volumes unless specified by the approving agency.

Runoff Quality Controls

In areas of redevelopment, there are three options to address stormwater runoff quality:

Reduce existing site impervious areas by 20%

If site conditions prevent a reduction in impervious areas, provide water quality control for at least 20% of the sites impervious area.

A combinations of 1 & 2 can be employed for impervious reductions between 0% and 20%. The combination of impervious area reduction and area control by a stormwater management practice must equal or exceed 20%.

Notes: No explanation is provided as to where the 20% impervious area reduction was determined.

2. City of Seattle, WA

Runoff Quantity Controls

For redevelopment sites less than 9,000 sq. feet, the peak discharge rate from pervious and impervious surfaces shall not exceed 0.2 cfs per acre under the 25- year design storm. For redevelopment sites greater than 9,000 sq. feet, the peak discharge rate from pervious and impervious surface shall not exceed 0.15 cfs per acres under the 2- year design storm AND shall not exceed 0.2 cfs per acre under the 25- year design storm.

Runoff Quality Controls

No specific criteria is sited for runoff quality control, however is required to "control the sources of sediment and other contaminants and pollutants that could enter drainage water" by use of temporary and permanent best management practices

Notes: No explanation is provided as to where the 9,000 sq. foot area limit was determined, or where peak allowable flow rates were developed.

3. City of Portland, OR

Runoff Quantity Controls

Control of on site flows to maintain peak flows at the pre- development (defined as a site's ground cover prior to development, "i.e. Lewis & Clark days") for the 2-, 5-, and 10- year storm events.

Runoff Quality Controls

Criteria requires a 70% reduction of TSS from runoff generated by a design storm up to and including 0.83 inches of rain fall over a 24- hour period.

4. Georgia

Minimum standards for redevelopment sites are same as standards for new development, as follows:

Runoff Quantity Controls

24- hour extended detention of the 1- year, 24- hour storm event; post development to pre development rate control for the 25- year, 24- hour storm event.

Runoff Quality Controls

Stormwater management systems must be designed to remove 80% of the average post-development TSS load. If facility is designed to capture and treat the water quality volume (defined as the first 1.2 inches of rainfall from a site), the facility is considered adequate
Notes

"Pre- development conditions" is not defined in the case of redevelopment, therefore it could not be determined if existing impervious areas are included in the runoff calculations

5. Chester Creek

Runoff Quantity Controls

Runoff quantity control is accomplished by determining the pre-development RCN value or Rational "C" value from a provided chart to reflect existing conditions less restrictive than "meadow or B

class soils" (Chester Creek soils are primarily HSG "B") based on the percentage of exiting impervious cover. Post- development runoff must then meet pre- development rates based upon the given release rate criteria for the site.

Runoff Quality Controls

Water quality must be addressed using the following:

a. Infiltration
b. Extended detention
c. Implementation of additional design control

Riparian buffers are required where applicable (404.A.2).

Notes: Chart developed for "Adjusted" RCN or C values is based on the composite value of the impervious and pervious sections as follows:

> for RCN Method: %imperv * 98 + %perv * 58 (meadow "B" soils)
> for Rational Method: %imperv * 0.95 + %perv * 0.12 (Lawn, sandy soil, avg slope)

III. CONCLUSIONS

An ordinance which addresses development in an area where redevelopment is encouraged should provide the developer with some credit to consider on site existing impervious conditions when determining the amount of stormwater runoff which should be stored or treated. If no credit is given, and the developer must design to meet pre- existing (i.e. no impervious cover) rates, the standards may discourage the use of redevelopment sites. However, this must be balanced with the desire to improve existing conditions as it relates to improving water quality and reducing potential flood damages to downstream areas.

Of the five ordinances reviewed, the Portland, OR criteria appears to present the most stringent standards to meet by requiring onsite flows for redevelopment sites to be limited to pre existing (i.e. undeveloped) rates and no credit is given for existing on site impervious cover. The Seattle, WA criteria specifies target flow values which are site independent and again do not consider existing impervious cover. Both of these ordinances are considered to be strict criteria which may discourage redevelopment projects in areas where the developer has an option to use undeveloped sites. In areas where there are little undeveloped available lands and development pressures are high, these ordinances may be considered to reduce downstream flooding and water quality impacts.

Of the remaining ordinances, Georgia, Maryland & Chester Creek, the Georgia and Maryland criteria were not specific enough to determine if existing impervious cover was considered to be part of the pre- development conditions. However, the Chester Creek ordinance clearly considers existing impervious cover in the determination of pre development conditions. The charts developed for the Chester Creek ordinance are based upon assuming that the pre development site is underlain by "B" soils, which is somewhat conservative when determining the storage / treatment volumes for post development runoff, if the site were actually underlain by a "C" or "D" soil. The Chester Creek

ordinance also requires that water quality issues be addressed in the form of TSS reductions and groundwater recharge. The approach of this ordinance is more suitable for areas where developer have the option of choosing undeveloped sites for development, rather than redevelopment sites. The water quantity criteria coupled with then currently promoted water quality criteria should both encourage redevelopment projects while improving existing water quality concerns and flooding concerns, to a lesser degree. In areas where downstream flooding is a current problem, additional credits (i.e. exemption from water quantity criteria as in the MD ordinance) may be given to the developer is a reduction in total impervious area can be attained.

APPENDIX

1. Maryland

A. Definition

"Redevelopment" means any construction, alteration, or improvement exceeding 5,000 square feet of land disturbance performed on sites where existing land use is commercial, industrial, institutional, or multifamily residential.

B. When Stormwater Management Is Required

Redevelopment

1. An approving agency shall require that stormwater management be addressed for redevelopment. Proposed redevelopment project designs shall include:
   a. A reduction in impervious area;
   b. The implementation of stormwater management practices; or
   c. A combination of both §D (1) (a) and (b) of this regulation to result in an improvement to water quality.

2. Unless otherwise specified by watershed management plans developed according to §E of this regulation, all redevelopment projects shall reduce existing site impervious area by at least 20 percent.

3. Where site conditions prevent the reduction of impervious area, stormwater management practices shall be implemented to provide water quality control for at least 20 percent of the site's impervious area.

4. When a combination of impervious area reduction and stormwater management practice implementation is used for redevelopment projects, the combination of impervious area reduction and the area controlled by a stormwater management practice shall equal or exceed 20 percent.

5. An approval authority may allow practical alternatives where conditions prevent impervious area reduction or on-site stormwater management. Practical alternatives include, but are not limited to:
   a. Fees paid in an amount specified by the approving agency;
   b. Off-site BMP implementation for a drainage area comparable in size and percent imperviousness to that of the project;
   c. Watershed or stream restoration;
   d. Retrofitting; or
   e. Other practices approved by the appropriate authority.

6. The recharge, channel protection storage volume, and overbank flood protection volume requirements specified in the Design Manual do not apply to redevelopment projects unless specified by the approving agency.

7. On-site or off-site channel protection storage volume requirements as specified in the Design Manual may be imposed if watershed management plans developed according to §E of this regulation indicate that downstream flooding or erosion need to be addressed.

8. Variations of this redevelopment policy shall be approved by the Administration.

C. Redevelopment Provisions That Different From Requirement

An approving agency may develop quantitative waiver and redevelopment provisions for stormwater management that differ from the requirements of this chapter. These provisions shall be developed only as part of an overall watershed management plan. Watershed management plans developed for the purposes of implementing different stormwater management policies for waivers and redevelopment shall:

1. Include detailed hydrologic and hydraulic analyses to determine hydrograph timing.
2. Evaluate both quantity and quality management;
3. Include cumulative impact assessment of watershed development.
4. Identify existing flooding and receiving stream channel conditions;
5. Be conducted at a scale determined by the approving agency; and
6. Specify where on-site or off-site quantitative and qualitative stormwater management practices are to be implemented

D. References

Title 26 DEPARTMENT OF THE ENVIRONMENT. Subtitle 17 WATER MANAGEMENT. Chapter: 02 Stormwater Management. Authority: Environment Article, §4-203, Annotated Code of Maryland. 26.17.02.00.

E. URLs

https://consumail.gov.state.md.us/comar/dsd_web/comar_web/subtitle_chapters/26_Chapters.htm#Subtitle17

2. City of Seattle

A. Definition

All land disturbing activities or addition or replacement of impervious surface are required to comply with this section, even where drainage control review is not required. Exception: Maintenance, repair, or installation of underground or overhead utility facilities, such as, but not limited to, pipes, conduits and vaults, is not required to comply with the provisions of this section.

"Replaced impervious surface" or "replacement of impervious surface" means impervious surface that is removed down to earth material and a new impervious surface is installed

"New development" means any of the following activites: Structural development, including construction of a new building or other structure; Expansion or alteration of an existing structure that results in an increase in the footprint of the building or structure; Land disturbing activities; Creation or expansion of impervious surface; Demolition; Subdivision and short subdivision of land as defined in RCW58.17.020.

B. When Compliance Is Required

Redevelopment

The portion of the site being redeveloped shall at least comply with the minimum requirements below. Projects exceeding 9,000 square feet of developmental coverage must also comply with the additional requirements. Compliance is required regardless of the type of redevelopment, and regardless of whether or not a permit is required. However, only those projects meeting the review thresholds set forth in Subsection B below must prepare and submit the required plans.

C. Minimum Requirements for All Projects

All projects must comply with the requirements of this subsection. Projects with more than 9,000 square feet of developmental coverage shall also comply with the requirements of additional requirement for larger project below. The Director of Construction and Land Use may also require projects with 9,000 square feet or less of developmental coverage to comply with the requirements set forth in additional requirement for larger project when necessary to accomplish the purposes of this Subtitle. In making this determination, the Director of Construction and Land Use may consider, but not be limited to, the following attributes of the site: location within an Environmentally Critical Area; proximity and tributary to an Environmentally Critical Area, proximity and tributary to an area with known erosion or flooding problems.

1. Discharge Point: The discharge point for drainage water from each site shall be selected as set forth in rules promulgated jointly by the Director of Seattle Public Utilities and the Director of Construction and Land specifying criteria, guidelines and standards for determining drainage discharge points to meet the purposes of this Subtitle. The criteria

shall include, but not be limited to, preservation of natural drainage patterns and whether the capacity of the drainage control system is adequate for the additional volume. For those projects meeting the review threshold, the proposed discharge point shall be identified in the drainage control plan required by paragraph C4 below, for review and approval or disapproval by the Director of Construction and Land Use.

2. Discharge Rate. To the extent practical, the peak drainage water discharge rate from pervious and impervious surfaces on the site shall not exceed 0.2 cubic feet per second per acre under design storm conditions. The Director of Construction and Land Use and the Director of Seattle Public Utilities may jointly promulgate rules modifying the discharge rate requirement for projects which will result in less than 2,000 square feet of new impervious surface. The Director of Construction and Land Use and the Director of Seattle Public Utilities may jointly promulgate rules allowing exceptions to the permissible peak discharge rate for property which discharges water directly to a designated receiving water or directly to a public storm drain which the Director of Seattle Public Utilities determines has sufficient capacity to carry existing and anticipated loads from the point of connection to a receiving water. The design storm used to determine detention volume necessary to obtain the required discharge rate shall be a storm with a statistical probability of occurrence of one in 25 in any given year. If the project is within an environmentally critical area, the design storm requirements of SMC Chapter 25.09, Regulations for Environmentally Critical Areas, shall be applied. The Director of Seattle Public Utilities and the Director of Construction and Land Use shall jointly adopt rules specifying the methods of calculation to determine the discharge rate. Where laws or regulations of the federal government or the State of Washington impose a more stringent requirement, the more stringent requirement shall apply.

3. Control Measures. During new development, redevelopment and land-disturbing activities, best management practices, as further specified in rules promulgated jointly by the Director of Seattle Public Utilities and the Director of Construction and Land Use, shall be used to accomplish the following:

   a. Control erosion and the transport of sediment from the site through measures such as mulching, matting, covering, silt fences, sediment traps and catch basins, settling ponds and protective berms;

   b. Permanently stabilize exposed soils that are not being actively worked, through such methods as the installation of permanent vegetative cover and installation of slope protective materials; and

   c. Control the introduction of contaminants and pollutants into, and reduce and treat contaminants in drainage water, drainage control facilities, surface water and groundwater, and the public drainage control system by methods such as covering of material stockpiles; proper disposal of hazardous materials; regular cleaning of catch basins, gravel truck loading and heavy equipment areas; spill control for fueling operations; sweeping; and maintaining erosion control protective features described above.

4. Drainage Control Plan. For those projects meeting the review thresholds set forth in Subsection B above and which are less than 9,000 square feet, the applicant shall submit a drainage control plan as set forth in rules promulgated jointly by the Director of Seattle Public Utilities and the Director of Construction and Land Use. Standard designs for drainage control facilities as set forth in the rules may be used. Projects exceeding 9,000 square feet must submit a comprehensive drainage control plan as set forth in Subsection D below. The Director of Construction and Land Use may impose additional requirements, including a comprehensive drainage control plan prepared by a licensed civil engineer, when the project has complex or unusual drainage, or when additional requirements are otherwise necessary to accomplish the purposes of this Subtitle.

5. Memorandum of Drainage Control. The owner(s) of the site shall sign a "memorandum of drainage control" that has been prepared by the Director of Seattle Public Utilities. Completion of the memorandum shall be a condition precedent to issuance of any permit or approval for which a drainage control plan is required. The memorandum shall not be required when the drainage control facility will be owned and operated by the City. A memorandum of drainage control shall include:

   a. The legal description of the site.

   b. A summary of the terms of the drainage control plan, including any known limitations of the drainage control facilities, and an agreement by the owners to implement those terms;

   c. An agreement that the owner(s) shall inform future purchasers and other successors and assignees of the existence of the drainage control facilities and other elements of the drainage control plan, the limitations of the drainage control facilities, and of the requirements for continued inspection and maintenance of the drainage control facilities;

   d. The side sewer permit number and the date and name of the permit or approval for which the drainage control plan is required;

   e. Permission for the City to enter the property for inspection, monitoring, correction, and abatement purposes;

   f. An acknowledgment by the owner(s) that the City is not responsible for the adequacy or performance of the drainage control plan, and a waiver of any and all claims against the City for any harm, loss, or damage related to the plan, or to drainage or erosion on the property, except for claims arising from the City's sole negligence; and

   g. The owner(s)' signatures acknowledged by a notary public. The applicant shall file the memorandum of drainage control with the King County Department of Records and Elections so as to become part of the King County real property

records. The applicant shall give the Director of Seattle Public Utilities proof of filing of the memorandum.

6. Flood-Prone Areas. Sites within flood prone areas must employ measures to minimize the potential for flooding on the site and for the project to increase the risk of floods on adjacent or nearby properties. Flood control measures shall include those set forth in other titles of the Seattle Municipal Code and rules promulgated there under, including but not limited to, SMC Chapter 25.06 (Floodplain Development) and Chapter 25.09 (Environmentally Critical Areas), and in rules promulgated jointly by the Director of Seattle Public Utilities and the Director of Construction and Land Use to meet the purposes of this subsection.

7. Natural Drainage Patterns. Natural drainage patterns shall be maintained.

8. Obstruction of Watercourses. Watercourses shall not be obstructed.

D. Additional Requirements for Large Projects

All projects exceeding 9,000 square feet of developmental coverage and those small projects identified by the Director according to subsection C above must comply with the requirements set forth in this subsection. These requirements are in addition to the requirements set forth in Subsection C above. When the Directors develop rules prescribing best management practices for particular purposes, whether or not those rules are adopted by ordinance, BMPs prescribed in the rules shall be the BMPs required for compliance with this Subsection. Best management practices shall include, but not be limited to, maintenance and housekeeping practices such as proper storage of oil barrels and other contaminant sources, covering material stockpiles, proper use and storage of hazardous materials, as well as structural facilities such as detention tanks, wet ponds, extended detention dry ponds, infiltration, vegetated streambank stabilization, structural stabilization, catch basins, oil/water separators, grassed swales, and constructed wetlands.

1. In addition to detaining a 25-year storm to a release rate of 0.2 cubic feet per second per acre, the peak drainage water discharge rate from projects of more than 9,000 square feet of developmental coverage shall not exceed 0.15 cubic feet per second per acre in a two-year storm;

2. Control the sources of sediment and other contaminants and pollutants that could enter drainage water, including the selection, design and maintenance of temporary and permanent best management practices;

3. Minimize streambank erosion and effects on water quality in streams, including the selection, design and maintenance of temporary and permanent best management practices, where stormwater is discharged directly to a stream or to a conveyance system that discharges to a stream;

4. Minimize the introduction of sediment, heat and other pollutants and contaminants into wetlands, including the selection, design and maintenance of temporary and permanent best management practices, where stormwater discharges directly to a wetland or to a conveyance system that discharges into a wetland;

5. Analyze impacts to off-site water quality resulting from the project. The analysis shall comply with this Subsection and rules promulgated pursuant to this Subsection. The analysis shall provide for mitigation of all surface water quality or sediment quality impacts. The impacts to be evaluated and mitigated shall include at least the following:

   a. Amount of sedimentation;
   b. Streambank erosion;
   c. Discharges to groundwater contributing to recharge zones;
   d. Violations of state or federal surface water, groundwater, or sediment quality standards; and
   e. Spills and other accidental illicit discharges;

6. A schedule shall be provided for inspection and maintenance of proposed temporary and permanent drainage control facilities and other best management practices. The schedule shall meet the requirements of this Subtitle and rules promulgated under this Subtitle.

7. In addition to the requirements described above, for land disturbing activities and demolition of structures, an erosion/sediment control plan designed to comply with the requirements and purposes of this Subtitle and rules promulgated hereunder shall be submitted and implemented. The erosion/sediment control plan shall be designed to accomplish the following:

   a. Stabilization of exposed soils and sediment trapping;
   b. Delineation of limits on clearing and easements;
   c. Protection of adjacent property;
   d. Appropriate timing and stabilization of sediment trapping measures;
   e. Minimization of erosion on cut-and-fill slopes;
   f. Control of off-site erosion;
   g. Stabilization of temporary conveyance channels and outlets;
   h. Protection of storm drain inlets;
   i. Minimization of transport of sediment by construction vehicles;
   j. Appropriate timing for removal of temporary best management practices;
   k Control of discharges from construction site dewatering devices to minimize contamination of drainage water, and
   l. Inspection and maintenance of best management practices for erosion/sediment control to insure functioning at design capacity.

8. Comprehensive Drainage Control Plan. A comprehensive drainage control plan to comply with the requirements of this Subtitle and rules promulgated hereunder and to accomplish the purposes of this Subtitle shall be submitted with the permit application. If

shall be prepared by a licensed civil engineer in accordance with standards adopted by the Director of Construction and Land Use.

E. References

Seattle Municipal Code (SMC) SMC 22.800.010- Stormwater, Grading and Drainage Control Code

An ordinance Relating to the Stormwater, Grading, and Drainage Control Code, as adopted by Ordinance 116425 and amended by Ordinances 117432, 117697, 117789, and 118396; amending Chapter 22.800, entitled "Title, Purpose, Scope, and Authority"; amending Chapter 22.801, entitled "Definitions"; amending Chapter 22.802, entitled "Stormwater, Drainage, and Erosion Control"; amending Chapter 22.804, entitled "Grading"; and amending Chapter 22.808, entitled "Administration and Enforcement."

F. URLs

http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?s1=22.800&s2=&S3=&Sect4=AND&l=20&Sect1=IMAGE&Sect3=PLURON&Sect5=CODE1&d=CODE&p=1&u=/~public/code1.htm&r=1&Sect6=HITOFF&f=G

http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?d=CBOR&s1=119968.ordn.&Sect6=HITOFF&l=20&p=1&u=/~public/cbor2.htm&r=1&f=G

3. City of Portland

G. Definition

Redevelopment: Any development that requires demolition or complete removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than 50% of the street width is removed and re-paved.

H. Requirements

Pollution Reduction Requirements

The City of Portland has a citywide pollution reduction requirement for all new development projects with over 500 square feet of impervious development footprint area, and all redevelopment projects redeveloping over 500 square feet of impervious surface. This requirement is 70 percent removal of total suspended solids (TSS) from runoff generated by a design storm up to and including 0.83 inches of rainfall over a 24-hour period (NRCS Type 1A distribution). Appendix B provides a more detailed definition of "70 percent removal of TSS", which is actually a function of influent TSS concentration.

Flow Control Requirements

Flow control requirements are intended to maintain post-development peak flows at their pre-development levels and to maintain peak flows within the capacity of the conveyance system for most storm events. Specifically, on-site flow control shall be sufficient to maintain peak flows at their pre-development levels for the 2-year, 5-year, and 10-year runoff events. (Note that for redevelopment projects, pre-development conditions are defined as undeveloped land. See definition in Section 1.3). Surface retention facilities are required to the maximum extent practicable to control stormwater volumes (see exceptions in Section 1.6).

I. Parking Lots

Surface Parking Lot Requirements

Parking and Loading describes dimensions, landscaping and other requirements for parking lots. Title 33.248: Landscaping and Screening describes planting requirements for parking lots and other site uses. (Also see Chapter 5.0 for a list of approved parking lot trees.) Any new parking lot that creates more than 500 square feet of impervious surface, or any redeveloped parking lot (see definition of redevelopment in Section 1.3) that redevelops more than 500 square feet of impervious surface, must use the landscape area required by the zoning code to manage stormwater from the new or redeveloped area. Existing parking lots required to meet the non-conforming use landscaping requirements under Title 33.258.070, must use simplified

approaches where practicable in the newly required landscaped areas. Where it is not practical for runoff to flow into landscaped areas this requirement does not apply. The following exceptions and/or conditions to these requirements may apply. If an exception is claimed, the applicant must still fulfill all other relevant requirements of Chapters 1.0 through 7.0 of this manual

1. The parking lot or a portion of it is designated as a high-use (see Chapter 4.0, Section 4.11) and is subject to requirements that may conflict with the use of landscaping for stormwater management.

2. Contaminated soil conditions on the site preclude the use of landscape infiltration. In this situation, landscape facilities may be used for stormwater management, but must be lined to prevent infiltration.

3. The parking lot has been approved without landscaping, or has landscaping conditions that conflict with the use of the landscaping for stormwater management (For example, if landscaping is required in a location that cannot receive stormwater as gravity flow, that portion of the landscaping would not have to be used for stormwater management.) The following simplified approaches from this chapter may be used to meet these requirements:

    a. Vegetated swales
    b. Grassy swales
    c. Vegetated filters
    d. Planter boxes
    e. Vegetated infiltration basins
    f. Sand filters
    g. Soakage trenches (if site soil conditions support their use, and the surface of the trench is not paved over) The appropriate sizing requirements shown on Form SIM shall be used to calculate the area needed for the applied measures. If the landscaped area(s) within the parking lot are not adequately sized to meet the requirements of this chapter, the applicant has the following options:
    h. Increase the landscaped area(s) within the parking lot to accommodate the required stormwater facility size, or
    i. Use additional stormwater management facilities (which can include non-landscaped approaches) to obtain the required level of management.
    j. Additional disposal measures (e.g., drywells, soakage trenches, off-site storm sewers, drainage ways, or ditches) may be required through building and plumbing codes, as approved by BES and OPDR.

Tips for Parking Lot Design

1. Design the grading to direct stormwater runoff into landscape areas. Depress the landscape areas adjacent to the parking surfaces to allow runoff to enter. See the vegetated swale detail in this chapter for a typical cross-section.

2. Maximize sheet flow opportunities and, if possible, avoid piping that drives the water level down, making it difficult to manage in surface facilities.

3. Provide numerous curb cuts (one every 10 feet) or use fire stops or other means to protect the landscape areas and allow maximum dispersal of the flows.

4. Consider design elements such as berms or trench drains.

5. When possible, situate buildings or fill areas on the high elevations of the site.

6. Make certain the design includes overflow and appropriate disposal methods. Overflow routes must show a safe escape route for the 100-year storm event.

7. Note that the parking lot tree standard is 3 caliper inches, unless the tree is chosen from the approved parking lot tree list, when it can be 2 caliper inches.

J. References

2002 Stormwater Management Manual, Adopted July 1, 1999, Revised September 1, 2002. Environmental Services, City of Portland Clean River Works

K. URLs

http://www.cleanrivers-pdx.org/tech_resources/2002_swmm.htm

4. Georgia

A. Definitions

Redevelopment is defined as structural development (construction, installation or expansion of a building or other structure), creation or addition of impervious surfaces (creating an additional 5,000 s.f. of impervious area), replacement of impervious surface not part of routine maintenance, and land disturbing activities associated with structural or impervious development. Redevelopment does not include such activities as exterior remodeling

B. Stormwater Management for Area of New Development and Redevelopment

The focus of this Manual is how to effectively deal with the impacts of urban stormwater runoff through effective and comprehensive stormwater management. Stormwater management involves both the prevention and mitigation of stormwater runoff quantity and quality impacts as described in this chapter through a variety of methods and mechanisms. Volume 2 of this Manual deals with ways that developers in Georgia can effectively implement stormwater management to address the impacts of new development and redevelopment, and both prevent and mitigate problems associated with stormwater runoff. This is accomplished by:

1. Developing land in a way that minimizes its impact on a watershed, and reduces both the amount of runoff and pollutants generated

2. Using the most current and effective erosion and sedimentation control practices during the construction phase of development

3. Controlling stormwater runoff peaks, volumes and velocities to prevent both downstream flooding and streambank channel erosion

4. Treating post-construction stormwater runoff before it is discharged to a waterway Implementing pollution prevention practices to prevent stormwater from becoming contaminated in the first place

5. Using various techniques to maintain groundwater recharge

The goal of a set of minimum stormwater management standards for areas of new development and significant redevelopment is to reduce the impact of post-construction stormwater runoff on the watershed. This can be achieved by (1) maximizing the use of site design and nonstructural methods to reduce the generation of runoff and pollutants, (2) managing and treating stormwater runoff though the use of structural stormwater controls; and (3) implementing pollution prevention practices to limit potential stormwater contaminants.

It should be noted that the standards presented here are recommended for all communities in Georgia. They may be adopted by local jurisdictions as stormwater management development requirements and/or may be modified to meet local or watershed-specific stormwater

management goals and objectives. Please consult your local review authority for more information.

The minimum standards for development are designed to assist local governments in complying with regulatory and programmatic requirements for various state and Federal programs including the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit program and the National Flood Insurance Program under FEMA.

C. Additional Requirements

New development or redevelopment in critical or sensitive areas, or as identified through a watershed study or plan, may be subject to additional performance and/or regulatory criteria. Furthermore, these sites may need to utilize or restrict certain structural controls in order to protect a special resource or address certain water quality or drainage problems identified for a drainage area.

D. Georgia Stormwater Management Manual Volume 2 (Technical Handbook)

The following standards are the recommended minimum stormwater management performance requirements for new development or redevelopment sites falling under the applicability criteria in subsection 1.2.2.1. (The word "shall" in brackets is provided for local jurisdictions that wish to adopt these standards as part of their stormwater management ordinances) A more detailed explanation of each minimum standard is provided in the next subsection.

Minimum Standard #1 – Use of Better Site Design Practices for Stormwater Management
Site designs should preserve the natural drainage and treatment systems and reduce the generation of additional stormwater runoff and pollutants to the fullest extent practicable.

Minimum Standard #2 – Stormwater Runoff Quality
All stormwater runoff generated from a site should [shall] be adequately treated before discharge. Stormwater management systems (which can include both structural stormwater controls and better site design practices) should [must] be designed to remove 80% of the average annual post-development total suspended solids (TSS) load and be able to meet any other additional watershed or site-specific water quality requirements.

It is presumed that a stormwater management system complies with this performance standard if: It is sized to capture and treat the prescribed water quality treatment volume, which is defined as the runoff volume resulting from the first 1.2 inches of rainfall from a site, and appropriate structural stormwater controls are selected, designed, constructed, and maintained according to the specific criteria in this Manual. Runoff from hotspot land uses and activities is adequately treated and addressed through the use of appropriate structural stormwater controls and pollution prevention practices.

Minimum Standard #3 - Stream Channel Protection

Stream channel protection should [shall] be provided by using all of the following three approaches: 24-hour extended detention storage of the 1-year, 24-hour return frequency storm event; erosion prevention measures such as energy dissipation and velocity control; and preservation of the applicable stream buffer.

Minimum Standard #4 – Overbank Flood Protection

Downstream overbank flood protection should [shall] be provided by controlling the post-development peak discharge rate to the predevelopment rate for the 25-year, 24-hour return frequency storm event. If control of the 1-year, 24-hour storm (Minimum Standard #3) is exempted, then overbank flood protection should [shall] be provided by controlling the post development peak discharge rate to the predevelopment rate for the 2-year through the 25- year return frequency storm events.

Minimum Standard #5 Extreme Flood Protection

Extreme flood protection should [shall] be provided by controlling and/or safely conveying the 100-year, 24-hour return frequency storm event such that flooding is not exacerbated. Existing and future floodplain areas should be preserved as possible.

Minimum Standard #6 – Downstream Analysis

A downstream hydrologic analysis should [shall] be performed to determine if there are any additional impacts in terms of peak flow increase or downstream flooding while meeting Minimum Standards #1 through 5. This analysis should [shall] be performed at the outlet(s) of the site, and downstream at each tributary junction to the point(s) in the conveyance system where the area of the portion of the site draining into the system is less than or equal to 10% of the total drainage area above that point.

Minimum Standard #7 – Groundwater Recharge

Annual groundwater recharge rates should be maintained to the extent practicable through the use of nonstructural methods.

Minimum Standard #8 – Construction Erosion and Sedimentation Control

Erosion and sedimentation control practices shall be utilized during the construction phase or during any land disturbing activities.

Minimum Standard #9 -- Stormwater Management System Operation and Maintenance

The stormwater management system, including all structural stormwater controls and conveyances, should [shall] have an operation and maintenance plan to ensure that it continues to function as designed.

Minimum Standard #10 Pollution Prevention

To the maximum extent practicable, the development project should [shall] implement pollutant prevention practices and have a stormwater pollution prevention plan.

Minimum Standard #11 Stormwater Management Site Plan

The development project should [shall] prepare a stormwater management site plan for local government review that addresses Minimum Standards #1 through 10.

E. Better Site Design Practices

Reduce the Parking Footprint- Reduction of Impervious Cover

Description. Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, parking decks, and using porous paver surfaces or porous concrete in overflow parking areas where feasible and possible.

Key Benefits
Reduces the amount of impervious cover and associated runoff and pollutants generated

Using this practice
Reduce the number of parking spaces
Minimize stall dimensions
Consider parking structures and shared parking
Use alternative porous surface for overflow areas

Discussion
Setting maximums for parking spaces, minimizing stall dimensions, using structured parking, encouraging shared parking and using alternative porous surfaces can all reduce the overall parking footprint and site imperviousness.
Many parking lot designs result in far more spaces than actually required. This problem is exacerbated by a common practice of setting parking ratios to accommodate the highest hourly parking during the peak season. By determining average parking demand instead, a lower maximum number of parking spaces can be set to accommodate most of the demand. Table 1.4.2-2 provides examples of conventional parking requirements and compares them to average parking demand.

TABLE CONVENTIONAL MINIMUM PARKING RATIOS (SOURCE: ITE, 1987; SMITH, 1984; WELLS, 1994)

Land Use	Parking Requirement		Actual Average Parking Demand
	Parking Ratio	Typical Range	
Single family homes	2 spaces per dwelling unit	1.5–2.5	1.11 spaces per dwelling unit
Shopping center	5 spaces per 1000 ft² GFA	4.0–6.5	3.97 per 1000 ft 2 GFA
Convenience store	3.3 spaces per 1000 ft² GFA	2.0–10.0	
Industrial	1 space per 1000 ft² GFA	0.5–2.0	1.48 per 1000 ft 2 GFA
Medical/ dental office	5.7 spaces per 1000 ft² GFA	4.5–10.0	4.11 per 1000 ft² GFA

GFA = Gross floor area of a building without storage or utility spaces.

Another technique to reduce the parking footprint is to minimize the dimensions of the parking spaces. This can be accomplished by reducing both the length and width of the parking stall.

Parking stall dimensions can be further reduced if compact spaces are provided. While the trend toward larger sport utility vehicles (SUVs) is often cited as a barrier to implementing stall minimization techniques, stall width requirements in most local parking codes are much larger than the widest SUV structured parking decks are one method to significantly reduce the overall parking footprint by minimizing surface parking. Figure 1.4.2-20 shows a parking deck used for a commercial development.

Shared parking in mixed-use areas and structured parking are techniques that can further reduce the conversion of land to impervious cover. A shared parking arrangement could include usage of the same parking lot by an office space that experiences peak parking demand during the weekday with a church that experiences parking demands during the weekends and evenings.

Utilizing alternative surfaces such as porous pavers or porous cement is an effective way to reduce the amount of runoff generated by parking lots. They can replace conventional asphalt or concrete in both new developments and redevelopment projects. However, porous pavement surfaces generally require proper installation and more maintenance than conventional asphalt or concrete.

F. References

Georgia Stormwater Management Manual. Volume 1: Stormwater Policy guidebook First Edition August 2001, Atlanta Regional Commission

G. URLs

http://www.georgiastormwater.com

5. Center for Watershed Protection (CWP)

II. Definition

"Redevelopment" is the process in which an existing developed area is adaptively reused, rehabilitated, renovated or expanded.

"Infill" is development that occurs on smaller parcels that remain undeveloped but are within or very close to existing urban areas.

I. What Are The Best Incentives To Encourage Redevelopment?

1. Resolving the transportation problems, particularly for suburban commuters.
2. Waterfront development.
3. Shortening/ simplifying the approval process.
4. Unifying codes and ordinances.

J. Other Suggestions

1. Don't forget the temporal scale, e.g. over time redevelopment is very beneficial at the site level.
2. Don't forget the neighborhood based framework. Don't forget environmentally sensitive techniques inside the buildings.
3. Make it applicable to all areas of different climate, politics and technical expertise.
4. Use a word other than principle.

K. Tools and Techniques for Redevelopment and Infill

Practice Oriented

1. Maintain natural features as part of the landscape at a site and encourage tree planting and other revegetation practices.
2. Manage rooftop runoff through storage, reuse, and/or redirection to pervious surfaces for stormwater management.
3. Use alternative paving materials for parking and other pathways whenever possible and feasible.
4. Provide long term management plans for natural areas, public spaces, stormwater management facilities and lighting.

Program Oriented

1. Promote the rehabilitation of urban streams and the creation and restoration of aquatic corridors.
2. Encourage the use of green parking techniques by providing incentives whenever possible.

5. Monitor and eliminate illicit or unmanaged discharges into streams, lakes and estuaries and foster operation and maintenance practices that prevent or reduce pollutants entering the municipal or natural drainage system.
4. Promote environmental stewardship through outreach and education for the present and the future.
5. Encourage pollution prevention practices for businesses and municipalities to reduce pollutant loads and foster an environmental ethic.

Shared Principles

1. Use appropriate, effective, and economical stormwater management where possible.*
2. Encourage the incorporation of natural features as part of the streetscape.*
3. Master plan redevelopment areas to promote planting practices and provide green spaces (trees, urban parks, and community gardens) in the urban environment.*
4. Encourage the use of open space designs, including reduction of building footprints, preservation of natural areas, and innovative building techniques to reduce the amount of new impervious cover created.*
5. Encourage development designs that integrate new paths, open spaces, and architecture with the existing community.*

*Indicates principles that can be organized under both the Practice and Program.

L. URLs

http://www.cwp.org/index.html

6. Green Roofs for Healthy Cities

Water Benefit (other benefits are not list here)

In summer, green roofs retain 70-100% of the precipitation that falls on them; in winter they retain between 40-50%. A grass roof with a 4-20 cm layer of substrate can hold between 10-15 cm of water.

A. Stormwater Retention

Water is stored by the substrate and then taken up by the plants from where it is returned to the atmosphere through transpiration and evaporation.

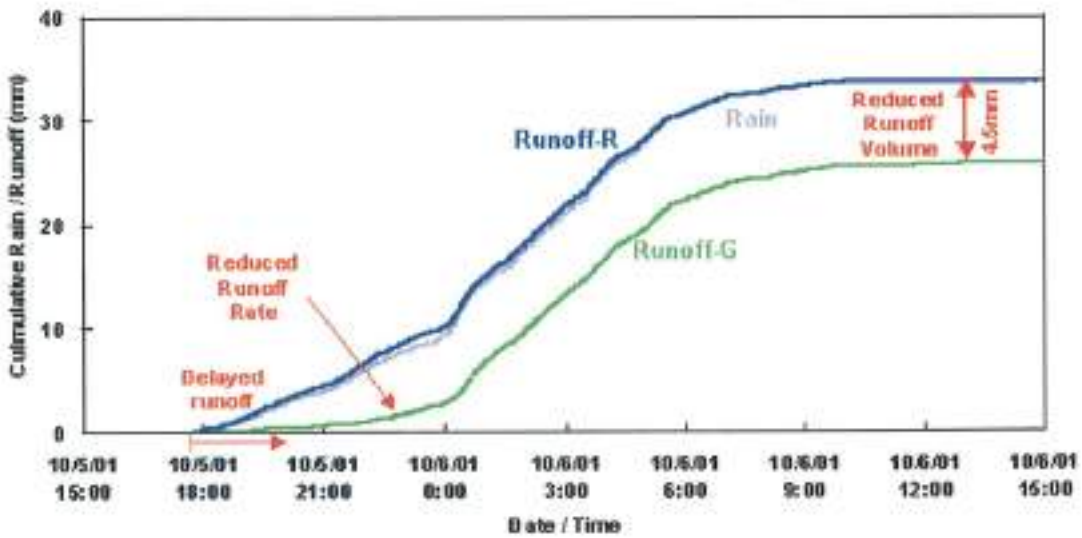
In summer, depending on the plants and growing medium, green roofs retain 70-80% of the precipitation that falls on them; in winter they retain between 25-40%. For example, a grass roof with a 4-20 cm (1.6 - 7.9 inches) layer of growing medium can hold 10-15 cm (3.9 - 5.9 inches) of water.

B. Water Filtration

Green roofs not only retain the rainwater, but also moderate the temperature of the water and act as natural filters for any of the water that happens to run off.

C. Temporal Delay of Stormwater Runoff and Reduced Runoff Volume

Green roofs reduce the amount of stormwater runoff and also delay the time at which runoff occurs, resulting in decreased stress on sewer systems at peak flow periods.



Source: National Research Council's Institute for Research in Construction

The graph above records the cumulative rainfall and runoff from the Green Roof and the Reference Roof during a 34mm (1.3 inches) rain event over a 15h period in October 2001. The green roof delayed runoff and reduced the runoff rate and volume. For more details on this research conducted by the National Research Council's Institute for Research in Construction, see the article on page 7 of the Winter 2002 issue of the Green Roof Infrastructure Monitor.

D. Regulatory/Policy Initiatives

The U.S. Clean Water Act promises to become an important regulatory driver of green roof implementation in the United States. The **Clean Water Act, Section 319 Grant**, addresses non-point source pollution and can provide a source of funding for green roofs.
To inquire about receiving Section 319 grant funding for green roof projects contact your **state nonpoint source coordinator**. Green roofs can be funded as demonstration projects throughout most states and can be used to mitigate the impacts of stormwater and combined sewer overflows in developed areas.
Two projects funded by this grant include:
Maryland: Montgomery Park, Grant Award: $92, 000.00

Arizona: Riverfront Residence, Grant Award: $33, 875.00

The **City of Seattle** requires that all new municipal buildings be LEED™ certified and green roofs provide an opportunity to gain as many as 5 points under this system. A number of LEED™ certified buildings have green roofs.
The City of Toronto's "Environmental Plan" and draft "Official Plan" both contain policies that encourage the implementation of green roof infrastructure
The City of Chicago passed an **Energy Conservation Ordinance** on June 3, 2001 requiring all new and replaced roofs to meet minimum standards of solar reflectance and emissivity using ASTM testing methods. This requirement, which is being phased in, can be met by installing a green roof system.

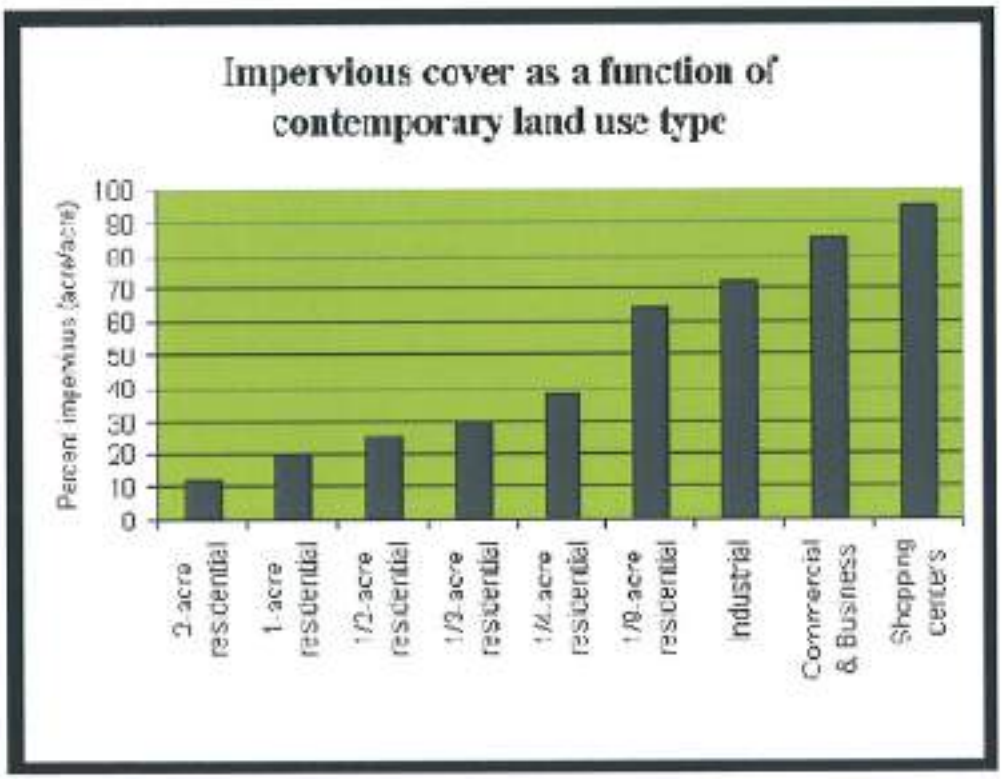
E. GreenRoof

Greenroofs reduce the volume of stormwater flowing into streams and drainage channels, resulting in the control of sediment transport and overall soil erosion. According to an article in the November/December 1998 issue of Erosion Control Magazine, the natural carpets provided by greenroofs protect both roofs and the soil below. Nitrogen, phosphorus and toxins can enter a vegetated stream as dissolved substances. Greenroofs' vegetated cover properties of friction, root absorption, clay, and soil organic matter can control these substances from entering a stream corridor (Dramstad, et al, 1996). In February of 1999, the International Erosion Control Association's Conference & Trade Exposition was held in Nashville, TN, and featured a training workshop and special section regarding the benefits and applications of roof greening systems. Thomas Roess of Strodthoff and Behrens GMBH of Germany presented on this subject, and is a frequent lecturer worldwide on greenroof technology.

Vegetation absorbs pollutants from rainwater, and greenroofs provide this same amenity. Heavy metals and nutrients found in stormwater are bound in the soil instead of being discharged into

the groundwater or streams or rivers. Over 95% of cadmium, copper and lead and 16% of zinc can be taken out of rainwater. Nitrogen levels can also substantially fall (The London Ecology Unit, 1993).

Perhaps the greatest ecological function a greenroof can provide is its stormwater management capacity. Impervious cover has become a function of contemporary land uses. As a result of new land use practices, cities across the nation have developed over-stressed sewer systems with urgent stormwater management problems. According to analysis of Lansat Satellite data by NASA climate scientists, University of Georgia researchers and others, metro Atlanta is losing 50 acres of tree cover per day. From 1988 to 1998 the 13-county metro area lost approximately 190,000 acres of tree cover to development (Charles Seabrook, 1999). Lost green space is then a by-product of the proverbial asphalt jungle, and the inherent natural processes associated with natural areas are also lost. The chart below from Bruce Ferguson's *Introduction to Stormwater: Concept, Purpose, Design* (1998), shows the amount of impervious cover that development and the new impervious pavements produce.



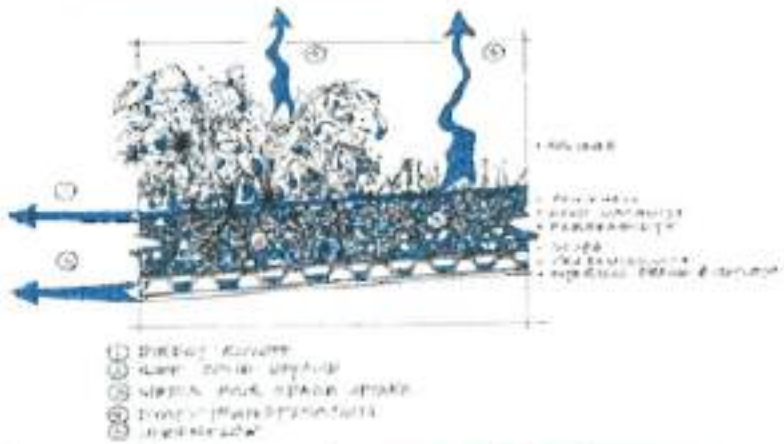
"We are obligated to restore the mechanisms of the earth's self-maintaining balance. Runoff must be moderated, treated, and returned to its restorative path in the soil," (Ferguson, 1998).



Source: ZinCo International 3/98 Brochure

On-site stormwater retention and runoff control from expansive roof surface areas of buildings can be accomplished through greenroofs. According to civil engineer Charlie Miller, Principal, of Roofscapes, Inc., "Vegetated roof covers may offer the only practical 'at-source' technique for controlling runoff in areas that already are highly urbanized." The reversal of damage caused by uncontrolled storm water runoff and non-point source pollution is possible within our urbanized watersheds. He believes that the intelligent use of best management practices (BMPs) can result in significant improvements, as well as long-term savings to individuals and municipalities (**www.roofmeadow.com**).

Depending on rain intensity and greenroof soil depths, runoff can be absorbed between 15 to 90 %, thereby considerably reducing runoff and potential pollutants from traditional impervious roofing surfaces. Plants intercept and delay rainfall runoff and the peak flow rate, alleviating combined sewer overflows, and eventually return water to the surrounding atmosphere by evaporation and transpiration. Average runoff absorption rates are between 50 to 60% (**www.roofmeadow.com**).



Courtesy of Roofscapes, Inc.; **www.roofmeadow.com**

The control of stormwater runoff is achieved by mimicking natural processes by intercepting and delaying rainfall runoff. Greater grass & plant diversity provides better plant uptake and simple friction, which creates less erosion, and more water is retained on the greenroof surface. Stormwater Natural Processes Detail from **www.roofmeadow.com**.

According to Charlie Miller, the installation of greenroofs is "a potential technique for relieving nuisance flooding and reducing hydraulic loads on combined storm sewer systems." He contends that, "In addition to providing immediate relief for overburdened stormwater management facilities, the deployment of vegetated roof covers can help reduce the overall costs of infrastructure rehabilitation in our older cities."

Possible impervious coverage restrictions may be reduced for developers who incorporate greenroofs into their site plan. Depending on local ordinances, greenroofs may be installed in

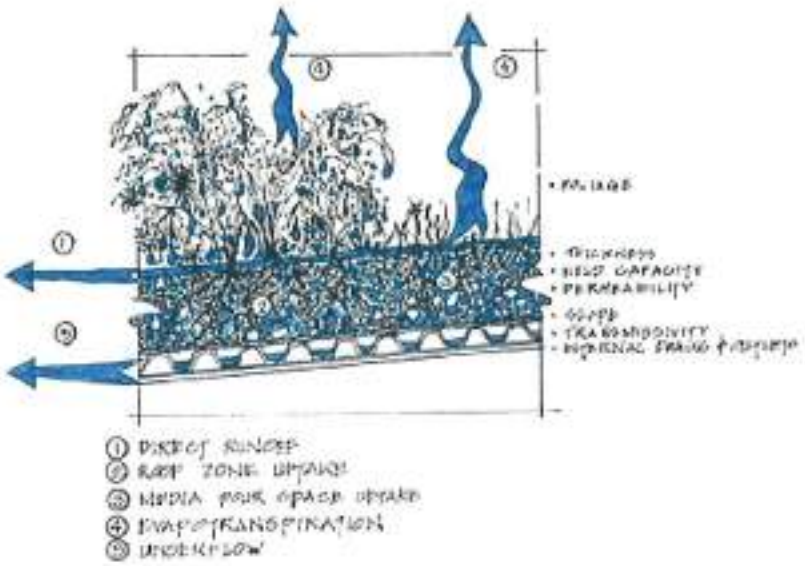
lieu of conventional stormwater practices. They can significantly reduce the size, or even completely eliminate the necessity for unsightly, space-wasting, and expensive detention ponds or underground galleries (Roofscapes, Inc., 1998). Although hard to quantify, there is also potential for downstream stormwater treatment savings.

Water Benefit

Control of stormwater runoff is achieved by mimicking the processes that occur in nature, intercepting and delaying rainfall runoff by:

- Capturing and holding precipitation in the plant foliage
- Absorbing water in the root zone
- Slowing the velocity of direct runoff as it infiltrates through the layers of vegetated cover

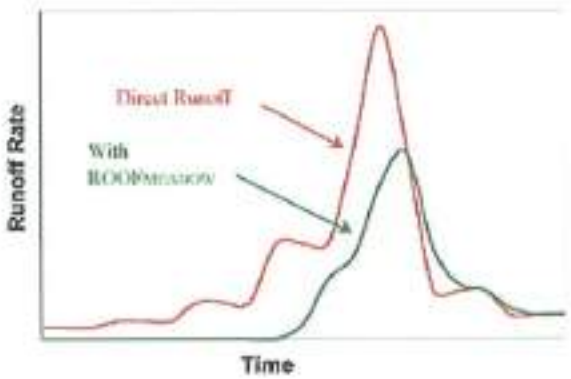
For small rainfall events, little runoff will occur and most of the precipitation will eventually return to the atmosphere by evaporation and transpiration. For larger storms, vegetated roof covers can significantly delay and attenuate the discharge of runoff from roofs.



Vegetated roof covers are effective methods of retarding runoff from roof surfaces during storms:

Compared to many other stormwater management practices, vegetated roof covers are unobtrusive, low maintenance, and reliable management systems. Vegetated roof covers are particularly effective when applied to extensive roofs, such as those that typify commercial and institutional buildings. They can be designed to achieve specified levels of stormwater runoff control, including reductions in:

Total annual runoff volume (reductions of **50 to 60 percent** are common place for vegetated roof covers) Peak runoff rates for selected design storm events



Stormwater runoff for a 3.35-inch, 24-hour rainfall event. This Roofmeadow incorporated a 3-inch deep layer of growth media.
© Roofscapes, Inc.

F. URLs

http://peck.ca/grhcc/
http://greenroofs.com/
http://roofscapes.com

7. Chester

A. Definition (ordinance language)

Redevelopment (in Article II;

Reconstruction of an existing improved, developed property, as of the date of adoption of this Ordinance. This includes all projects creating over 2,000 s.f. of additional impervious cover.

B. Water Quality and Quantity Control Drainage Plan preparation Procedure (Ordinance language)

1. Applicant determines if development meet definition of "Redevelopment" per Article II.
2. If yes, applicant adjust pre-development RCN or C value based on curves present in Section 401 C and Appendix B.

C. Section 401 C (ordinance language)

The Chester Creek Stormwater Management Plan requires water quality and water quantity controls as illustrated on the flow chart shown in Figure 4-1 and detailed in Section 404. The flow chart illustrates a three-step hierarchical process.

1. Infiltration
2. Extended detention
3. Implementation of additional design control

Must evaluate the outcome of each step before processing to next.
Riparian buffers are required where applicable (404.A.2).

D. Appendix B (report)

Figure B-3 Redevelopment project runoff criteria adjustment for pre-development conditions

Concern was expressed that imposing the release rate criteria on redevelopment projects might serve as a disincentive for developers. Therefore, an approach was proposed that would reduce the level of control required on redevelopment projects. This was accomplished by developing a chart which allows modification of pre-development conditions for which the stormwater management plan would be prepared. This chart adjusts the pre-development RCN value or "C" value to reflect conditions less restrictive than "meadow on B class soils" based on the percentage of exiting impervious cover.

Comment: The figure development is ok. But the goal of "Back to the natural condition" will not be reached.

E. Section 403 C (ordinance language)

Redevelopment projects shall meet peak discharge requirements based on the adjusted runoff control number (RCN) or "C" value illustrated by Figure B-3 in Appendix B.

F. Section 405 B (ordinance language)

For the purpose of pre-development flow rate determination, undeveloped land shall be considered as "meadow" poor condition, type "B" soils. (RCN=58, Rational "C"=0.12) unless the natural ground cover generates a lower curve number or Rational "C" value (i.e., forest). If a proposed development meets the definition of redevelopment as defined in Article II of this Ordinance, the applicant may adjust the pre-development RCN or "C" value based on the curves presented in Figure B-3.